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THE

F-15 STRIKE EAGLE HANDBOOK

SHEFFIELD



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F-15 STRIKE EAGLE

H A N D B O O K

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Foreword by Sid Meier, Co-Founder & Senior Vice President of MicroProse

Conquer the skies with specific hints, tips, and tactics pertaining to both versions of *F-15 Strike Eagle*.

COMPUTE! Books

PART I. GROUND SCHOOL

Before you earn your wings and step into an aircraft, you must spend hundreds of hours in intensive flight-training ground school. This is where all future pilots study—and in great detail—subjects ranging from aircraft mechanics to meteorology.

The next few chapters will give you an overview of the topics covered in ground school as they pertain to operating in the Eagle Rapid Deployment Team. This is your opportunity to pick up knowledge you may have missed in the rush to qualify for flight training, or that you may have subsequently forgotten. The information is important; due diligence is expected on your part.

Some of the topics covered are:

- Development of the F-15 Strike Eagle
- Pilot considerations
- Basic aerodynamics
- Weapons systems
- Proper use of F-15 weapons
- Theories of air combat

CHAPTER 1

Historical Overview

To know where you're going, it sometimes helps to know where you've been. Here, you'll get a brief description of the history and function of the Air Force, the development of your F-15 aircraft, and the F-15's distinguished combat history.

U.S. Air Force Historical Background

The Air Force Story

Although the Air Force is the newest military service of the U.S., it has packed a tremendous amount of growth into its relatively short life. Straight thinking, hard work, and courageous men have helped the Air Force become today's most potent aerospace force. Reaching this status is a remarkable achievement—the U.S. Air Force had very meager beginnings indeed.

On 1 August 1907, the Signal Corps of the U.S. Army established an Aeronautical Division to "Take charge of all matters pertaining to military ballooning, air machines, and all kindred subjects." The new division was assigned a total of two members, and one of those went "over the hill" shortly thereafter, leaving the Army with a one-man division.

Shortly, a contract was issued to the Wright Brothers to build a plane and to train several pilots. Three pilots eventually soloed, but two were transferred back to their original duties after the only plane was damaged in a crash. When the training facility was moved from Maryland to Texas, the lone pilot had to continue his Wright Brothers training by mail. Until 1911, the Army had only one pilot and only one plane.

The Army flying program received little backing and support. By 1914 the U.S. had lost the lead in aeronautics and had fallen very far behind in military aviation. Safely sur-

rounded by oceans, the U.S. didn't feel called upon, before World War I, to go with the Europeans in the air.

On 18 July 1914, Congress finally enacted legislation to give Army aviation recognition and put it on a firm and permanent basis. The act created the Aviation Section of the Signal Corps and authorized 60 officers and 260 enlisted men. However, a real air section had yet to be created, as was proven when the 1st Aero Squadron accompanied General Pershing across the Mexican border in pursuit of Pancho Villa in 1916. The eight Curtis aircraft they had lasted only six weeks. Six were crashed beyond repair and the other two were condemned and destroyed. It appeared that the 1st Aero Squadron's only value was for short mail flights—if the weather was good.

When World War I broke out, the Europeans had a healthy lead in aviation. Aircraft intended for reconnaissance only quickly began shooting at each other and air warfare was born. When the Germans developed the synchronizing gear to let machine gun bullets pass between the spinning propeller blades, dogfighting really took off.

When the U.S. finally declared war on Germany and entered World War I, we had only 35 pilots and no aircraft suitable for war. Finally realizing the need for air power, the Congress appropriated \$640 million for America's air arm.

The first American flyers to face the enemy were volunteers in the French unit of the Lafayette Escadrille, but by March 1917, the 94th and 95th Pursuit Squadrons were patrolling the front lines.

On 20 May 1918, Army Aeronautics was removed from the Signal Corps and established as a separate bureau, and by that September, 1500 planes were ready for a major assault on Germany. Although we had entered the war woefully unprepared, the U.S. pilots quickly showed how capable they were of fighting with the enemies. When the war ended, we had 45 squadrons in service with 767 pilots. These men downed 781 enemy planes and 75 balloons while losing only 289 planes and 48 balloons.

Between the wars, the Air Service fought mostly with the Navy, but it did take a step toward becoming a separate arm of the military in 1926 when it became the Air Corps, still under the Army.

When the Japanese attacked Pearl Harbor in 1941, the Air Corps was put on the defensive again, but it quickly mobilized

and went on the offensive with Jimmy Doolittle's famous Tokyo raid off the USS *Hornet*. Once the U.S. Air Services started running, they never looked back. They bombed Germany into submission and, of course, delivered the nuclear knockout punch to Japan in a B-29 named the *Enola Gay*.

Finally, on 18 September 1947, the Army Air Force became the United States Air Force—on equal footing with the U.S. Navy and Army. With the war over, the U.S. began building an Air Force for peacetime in the form of the Strategic Air Command. The Tactical forces, however, were still around and performed bravely in Korea and Vietnam, and the Air Force's airlift capability was displayed before the world during the Berlin Airlift.

Functions of the Department of the Air Force

The Department of the Air Force is responsible for the preparation of the air forces necessary for the effective prosecution of war and military operations short of war, and under integrated joint mobilization plans for the expansion of the peacetime component of the Air Force to meet the needs of war. Within the Department of the Air Force, the Air Force includes combat and service aviation forces.

Some major functions of the Air Force are to:

- Organize, train, equip, and provide forces for the conduct of prompt and sustained combat operations in the air—specifically, forces to defend the United States against air attack, gain and maintain air superiority, defeat enemy air forces, conduct space operations, and control vital air areas.
- Organize, train, equip, and provide forces for appropriate air and missile defense and space operations, including forces for strategic defense of the United States in accordance with joint doctrines.
- Organize, train, equip, and provide forces for strategic air and missile warfare.
- Organize, equip, and provide forces for joint amphibious, space, and airborne operations.
- Organize, train, equip, and provide forces for close air support and air logistic support to the Army and other forces, including airlift, air support, reshuffle of airborne operations, aerial photography, tactical air reconnaissance, and air interdiction of enemy land forces and communications.

- Organize, equip, train, and provide forces for air transport of the Armed Forces.
- Develop doctrine, procedures, and equipment for air defense from land areas.
- Furnish launch and space support for the Department of Defense.
- Organize, train, equip, and furnish land-based tanker forces for in-flight refueling support of strategic operations and deployments of aircraft of the armed forces and Air Force tactical operations.
- Organize, train, equip, and furnish forces to operate air lines of communication.
- Organize, train, equip, and furnish forces for the support of special operations.

Collateral functions include:

- Surface sea surveillance and antisurface ship warfare through air operations.
- Antisubmarine warfare and anti-air warfare operations to protect sea lines of communications.
- Aerial minelaying operations.
- Air-to-air refueling in support of naval campaigns.

Formation of the Eagle Rapid Deployment Team

As a result of the complexity and ineffectiveness of the 1986 Air Force and Navy strike against Libya, it was determined that a rapidly deployable air strike unit was needed. The Eagle Rapid Deployment Team was established in 1990 to meet this need. This team is capable of deploying to anywhere in the world and carrying out an air strike in a matter of hours, not days.

A major objective in the unit's formation was to keep the equipment and personnel needed to an absolute minimum. The F-15E Strike Eagle was, then, a perfect match for this mission—able to deliver a substantial weapons load deep in enemy territory, and able to defend itself from hostile air attack, eliminating the need for additional fighter air cover.

Team personnel are kept on standby 24 hours a day and can be airborne en route to a threat area in a matter of minutes. With its organic air refueling and logistics component, the fighters can be flown directly to the nearest airfield and

loaded with the ordinance needed to carry out the mission, and then a second fighter crew can take off immediately for the target area. This team is trained to deal with the various contingencies and problems caused by rapidly developing situations and hastily drawn up plans.

Transfer to the team is by invitation only—no volunteers. It's the tip of the Air Force's tactical spear and certainly the most likely to see combat action and to face hostile fire. Keep this in mind as you study and train.

Development of the Air Force Type F-15 Aircraft

The process of developing a military aircraft is a long and complicated affair. Often, the final product bears little resemblance to the original concept. Such was the case with the F-15.

The F-15 program came out of the Air Force's experience during the early 1960s when it was felt that a new fighter plane was needed to replace the aging F-4 Phantom. While the F-4 was one of the most versatile aircraft ever developed, the Air Force believed there was a need for a pure air-combat fighter in the tradition of the P-51 Mustang and the F-86 Sabre.

Project FX (Top Secret)

The FX program (Fighter eXperimental) was the result. The first FX proposals were very heavy (60,000 pounds) and employed the then-fashionable *swing-wing* design. This being too much like the ill-fated F-111 design, the momentum swung in the other direction until 1967 when the conceived aircraft was down to 30,000 pounds.

This 30,000-pound aircraft might have been developed had it not been for the Soviet Domodedovo Air Show in July 1967. It was there that the Soviets unveiled their new MiG-25, later designated *Foxbat* by NATO. The MiG-25 was capable of speeds up to Mach 2.8 and had an operational ceiling of 80,000 feet. It was immediately obvious that the current U.S. aircraft, the F-4 Phantom, was no match for the MiG-25.

As a result, the FX project was expedited, and bids to develop and build the new jet fighter were received from many aircraft manufacturers. By December 1968, the field had been narrowed to three manufacturers: McDonnell Douglas Aircraft

Company, Fairchild Hiller, and North American. The project aircraft was then officially designated the F-15.

Designation: *Eagle*

The name *Eagle*, however, wasn't immediately chosen. James McDonnell (or "Mr. Mac," as he was known) preferred names derived from his interest in the occult—*Phantom*, *Voodoo*, *Banshee*, *Demon*, and the like. When he agreed to consider bird names, *Eagle* was proposed. Since the F-15 was designed to be an all-weather fighter, *Eagle* was chosen—someone had read in a wildlife book that eagles could hunt in bad weather.

It was during this period that the possibility of using a modified version of the Navy's F-14 was first proposed. Congress wanted the Air Force and Navy to use the same aircraft; *commonality* was the latest buzzword. A number of studies, however, drew some conclusions: The F-14 wasn't maneuverable enough and required a two-man crew, something unacceptable to the Air Force. The idea of adapting the F-15 to function as a Navy carrier plane was also scrapped—costs would have increased while performance decreased with the addition of systems to use the Navy's *Phoenix* long-range missile.

Vendor Selection

In December 1969, McDonnell Douglas was named the winner of the F-15 contract, which called for 20 aircraft. Officially, the purpose of the program was "to efficiently acquire a fighter capable of gaining and maintaining air superiority through air-to-air combat." The designers' philosophy became "not a pound for air-to-ground." In other words, they were to build a pure dogfighter.

The design-concept paper for the F-15 stated that the general mission of the aircraft was that of air superiority, broken down into subheadings of escorting strike forces over unfriendly airspace, fighter sweeps ahead of those strike forces, combat air patrol, and tactical intercept and defense of friendly territory.

The most difficult of these missions, and the one most preferred by F-15 pilots, is the escorting or protecting of strike forces over enemy territory. Here exists the threat of anti-aircraft artillery and surface-to-air missiles as well as enemy fighters directed by ground control.

Delivery and ITP (Initial Test Program)

On 27 July 1969, the F-15 made its first flight from Edwards Air Force Base in California. The initial test program went fairly smoothly, mainly due to the extensive wind-tunnel testing that was performed. The main changes made were increasing the size of the airbrake and changing the pressure required to operate the control stick.

Figure 1-1. The F-15 Eagle



Two F-15 Eagles flying in close formation. Note the AIM-9L Sidewinder missiles beneath each aircraft's wings.

The initial weapons proposals also proved to be a problem. The F-15 was to have been fitted with the new GAU-7 25mm cannon, which used caseless ammunition—there were no metal shell casings that would have to be stored or ejected. Also, the new AIM-82 infrared missile was to be utilized. Both of these systems had numerous problems. The designers decided that since they were using a totally new airframe, new engines, and new avionics, they would do best to stick to tried-and-true weapons systems. The General Electric M61 20mm gun and the AIM-9L Sidewinder missile were selected because they had been used effectively for years.

On 16 June 1972, the first manufactured F-15 rolled out of the McDonnell Douglas production plant in St. Louis.

Replacement Comparison: F-15 Versus F-4

The final design of the F-15 is a vast improvement over its predecessor, the F-4, and many of its systems are much easier to maintain and service. The F-15 has 67 quick-access doors, for instance—four times the number on the F-4. Also, the re-launch turnaround time is 12 minutes—45-percent faster than that of the F-4.

Head-to-Head: The F-15 and F-4

System	F-15	F-4
Cockpit instruments	30	48
Black boxes	106	294
Flight control devices	9	16
Electrical connectors	808	905
Fuel system connectors	97	281
Lubrication points	202	510
Types of fasteners	1200	2800
Drag chute needed	No	Yes

The F-15's safety record is also extraordinary: It's the only fighter to complete its first 5000 hours of flight time without an accident.

The F-15 In Active Service

The first probation F-15 was delivered for active service to Luke Air Force Base on 14 November 1974. Since then, the F-15 has been deployed at United States Air Force (USAF) bases around the world. It also has been sold to Israel, Japan, and Saudi Arabia. Currently, the F-15 is being deployed to select units of the Air National Guard.

F-15 Streak Eagle

Computer projections at McDonnell Douglas predicted that the F-15 would easily beat many of the current time-to-altitude records. In early 1975, the Streak Eagle program went into operation, and at Grand Forks Air Force Base in North Dakota, a modified F-15 broke all existing time-to-altitude records. This one had been stripped of its gun, its radar, some avionics, the tail hook, one generator, some of the hydraulic system, and

the flap and speedbrake actuators. Even 40 pounds of external paint were removed.

After achieving the 30,000 meter record (98,425 feet), the F-15 continued up to over 102,000 feet before falling over and starting its descent. This made it the obvious choice for delivering the ASAT antisatellite weapon.

Streak Eagle Records

Altitude	Previous Time*	Type of Aircraft	F-15 Time*	Improvement
3000m (9843')	34.52	F-4	27.57	20%
6000m (19685')	48.79	F-4	39.33	19%
9000m (29528')	61.68	F-4	48.81	21%
12000m (39370')	77.14	F-4	59.38	23%
15000m (49212')	114.50	F-4	77.02	33%
20000m (65617')	169.80	MiG25	122.94	28%
25000m (82021')	192.60	MiG25	161.02	16%
30000m (98425')	243.86	MiG25	207.80	15%

*Time in seconds

Summary of F-15 Combat Action

When President Gerald Ford accepted the first F-15 on behalf of the Tactical Air Command in November 1974, the aircraft was heralded as the best air-to-air fighter ever built. It's not surprising, then, that the leaders of the Israeli Air Force were interested in the F-15. A deal was struck, and in December 1976, the Israelis received their first shipment of F-15 fighters.

With the tensions and hostilities in the Middle East during this time, it was probably inevitable that Israel would be the first to use the F-15 in combat.

The Middle East

In the spring of 1979, the Palestine Liberation Organization (PLO) drastically increased its terrorist attacks on Israel. In retaliation, Israel began a new wave of reconnaissance flights and bombing attacks on suspected terrorist camps and training facilities in Lebanon. Syria, in support of the PLO, began to fly air patrols over PLO camps in central Lebanon. The Syrian planes, mostly MiG-21s, had come close to Israeli reconnaissance planes on several occasions, but had never moved to within missile range or made any hostile moves.

F-15 Versus MiG-21

On 2 June 1979, Israeli F-4 Phantoms and A-4 Skyhawks flew to attack suspected terrorist bases near Sidon in southern Lebanon. Flying cover for the attack aircraft was a force of six F-15s and two Israeli-built Kafir fighters. All aircraft were guided by an E-2C AWACS (Airborne Warning And Control System) aircraft, a modified 747 that carried sophisticated radar and tracking equipment.

At approximately 11:00 a.m., the attack force was bounced by 8 to 12 Syrian MiG-21 aircraft. The F-15s and Kafirs immediately identified and engaged the MiG-21s. Within a three-minute period, six Syrian MiG-21s were downed and several others were reportedly damaged.

Of the six downed MiG-21s, four were destroyed by infrared homing missiles, one by a Sparrow radar-guided missile, and one by gunfire at close range. Five "kills" were given to F-15s and one to a Kafir.

The Israelis continued their reconnaissance flights, and on 19 September 1979, the MiG-23 made its combat debut when a flight of these newer Soviet-made aircraft fired air-to-air missiles at an Israeli F-4 Phantom. The F-4 was able to avoid the missiles (probably AA-8 Aphid infrared homing types) and return safely to base.

The Israeli intelligence service determined that a similar attack was planned five days later. So, on 24 September 1979, F-15s were again flying high cover when the controlling AWACS aircraft detected a large group of MiG-21s approaching. In this second brief air battle, four more MiG-21s were shot down. Again no F-15s were lost.

F-15 Versus MiG-25

These skirmishes continued through 1980. In March 1981, the F-15 and the newest Soviet-built machine—the MiG-25, which was capable of Mach 3—met for the first time. On 13 March 1981, a MiG-25 attacked an Israeli F-4 flying a reconnaissance mission. An F-15 Eagle was vectored to intercept and shot down the MiG-25 with a Sparrow missile. This was the first time a MiG-25 had been successfully intercepted and shot down.

Preemptive Osirak Reactor Strike

Shortly afterward on 7 June 1981, a group of F-15s flew cover for a flight of eight F-16s that successfully destroyed the Osirak nuclear reactor in Iraq. After the attack, the Israeli planes returned by flying over Jordan. Despite this overt violation of Jordanian airspace, no aircraft were sent to oppose them. Possibly the Jordanians were aware of the recent routing of the Syrian Air Force by F-15s and didn't wish to replay the incident.

Southern Lebanon

In the spring of 1982, tensions along the Israeli-Lebanese border again reached crisis level. Israel warned the PLO. Rocket attacks fell on Israeli villages.

On 6 June 1982 operation "Peace for Galilee" began as a large Israeli armored task force moved across the border into southern Lebanon. The intent was to remove the PLO, other terrorist groups, and the Syrians, from Lebanon. Israeli air attacks faced strong resistance in the form of surface-to-air missiles and Syrian MiGs.

Israel launched an immediate attack on the SAM locations and quickly destroyed 17 sites. The attacking force was met by more than 60 Syrian MiG-21 and MiG-23 fighters. F-15s and F-16s were flying cover for the strike force and engaged the MiGs in one of the largest air battles since World War II.

Twenty-nine MiGs were destroyed without a single Israeli loss. The Soviets were so shocked by the Syrian losses that the Deputy Commander of the Soviet Air Force was sent to investigate.

Many air battles were fought over the next several days until 11 June 1982, when a cease-fire went into effect. During the period from 6 June to 12 June, approximately 86 MiGs and five helicopters were destroyed by Israeli F-15s and F-16s without a single plane lost in air-to-air combat.

From the time the Israeli Air Force began flying the F-15 until the cease-fire in June 1982, their F-15s scored 58 kills with no losses against Syrian MiGs.

CHAPTER 2

The F-15 Version E Designation: *Strike Eagle*

The DRF (Dual-Role Fighter) Program

After the development of the F-15 for air combat missions, the USAF still needed a replacement for the aging F-111. The Air Force sought a *dual-role fighter* (DRF)—one that could not only mix it up in air-to-air combat, but could also carry a substantial bomb load in day or night and in all weather. Ironically, the very characteristics that made the F-15 an excellent fighter also made it a contender for the DRF program.

Multistage improvement programs began for both the F-15 and F-16 aircraft. Modifying the F-16 to perform this dual role required a new wing design, while F-15 modifications were made more in the area of avionics and airframe strengthening. Based on the cost of the programs, the F-15 was chosen, and on 24 February 1984, the Air Force Chief of Staff approved \$1.5 billion for upgrading 392 F-15s to perform the dual-role fighter mission. The F-15 DRF was designated the *Strike Eagle*.

F-15E Fact Sheet

Designer and Manufacturer: McDonnell Douglas Corp., St. Louis.

Power Plants: Two Pratt & Whitney F-100-PW-220 low-bypass engines, each producing 24,000 pounds of thrust.

Avionics:

- Hughes APG-70 synthetic aperture radar. Employs high-, medium-, and low-pulse repetition frequency for optimum all-aspect detection and lock-on. Also features high-resolution ground mapping modes.

- IBM Central Computer
- Kaiser wide-view HUD
- Honeywell ring-laser-gyro inertial navigation system
- Seven Sperry multipurpose color and monochrome display screens

Length: 63.3 feet

Height: 18.5 feet

Wingspan: 42.8 feet

Max Gross Takeoff Weight: 81,000 pounds

Speed: Mach 2.5 plus

Load Factor: -3g to +9g

Figure 2-1. F-15E Strike Eagle



The F-15E Strike Eagle has a two-man crew, advanced display systems, and the ability to carry a wide range of air-to-air and air-to-ground weapons.

The F-15 Strike Eagle is a two-man aircraft, with many changes to the cockpit. This redesign allows a new wide field-of-vision head-up display, automated navigation, and a series of nondedicated screens that can be used for displaying moving area maps, weapons choices, radar mapping, and FLIR (Forward-Looking InfraRed). These screens can be used for

targeting weapons and navigation. Software enhancements to the existing radar system allow the use of high-resolution radar ground maps and target detection up to 100 nautical miles away.

Figure 2-2. F-15 *Strike Eagle* Screens



This is a view of the front (top) and rear (bottom) seats of the F-15E Strike Eagle displays and screens. Note that this is a simulator.

This new F-15E Strike Eagle can deliver a weapons payload similar to that of an F-111 and can defend itself from air and ground attack in the process—something the heavier F-111 can't do.

Targeting/Navigation Systems

The new Hughes APG-70 Synthetic Aperture radar is the heart and soul of the Strike Eagle's navigation and targeting system. It can provide a high-resolution image at much greater distances than previous radar setups (exact range CLASSIFIED).

To counter the threat of radar emissions being detected by the enemy, the APG-70 doesn't operate continuously. In a high-threat situation, such as a deep interdiction mission behind enemy lines, the radar comes on briefly and makes a quick sweep. It then processes the return image into a photo-quality freeze frame of the area ahead. It scans a 90-degree arc in front of the aircraft. Once the target is located and the weapons officer has a clear picture of it, the target image and location are stored in the weapon system memory and the radar can be shut down, greatly reducing the chances of being located and targeted by enemy SAM systems and AAA (Anti-Aircraft Artillery).

Night and inclement weather offer good cover to avoid detection by one of the best devices on the battlefield, the Mark 1 Human Eyeball. The *low-altitude navigation and targeting infrared for night* system (LANTIRN) lets this Eagle hunt when most other systems are blind. The LANTIRN system allows the F-15E to deliver guided and unguided weapons as accurately at night and in bad weather as an F-16 can in daylight. This system is contained in two 500-pound pods: one for targeting and one for navigation. Both attach under the wings beneath the engine intakes.

Figure 2-3. F-15 Targeting and Navigation Equipment



The two LANTIRN pods shown under the F-15E allow it to perform deep interdiction missions in bad weather or at night.

The navigation pod contains the sensor for the FLIR (Forward-Looking InfraRed) system. This system produces TV-quality video images that are processed and projected directly onto the pilot's HUD (Head-Up Display) and to one of the WSO's (Weapons Systems Officer) CRT displays. The FLIR allows both crewmen to "see" the upcoming terrain almost as clearly as they could in daylight. This pod also contains the low-altitude terrain-following radar, which can be coupled directly to the flight controls for hands-off "in the weeds" flights down to 200 feet.

The targeting pod of the LANTIRN system contains another FLIR for target tracking and a laser target designator. Once the target area is reached, the targeting FLIR sweeps the area quickly to make a crisp freeze-frame image. The pilot or the WSO can then target any item in the image by placing a cursor on it. This information is processed and downloaded to the weapons, which can use it directly, such as the AGM-65 Maverick, or to the laser designator, which can guide smart bombs to the target. With enough altitude, targets can be designated from ten miles away. Maverick missiles can be deployed from even farther distances.

Weapons Systems

With only slight modifications, the F-15 can deliver an extraordinary range of weapons:

- AIM-7M Sparrow medium-range, semiactive radar air-to-air missiles
- AIM-9L Sidewinder infrared-homing air-to-air missiles
- AIM-120 Advanced medium-range air-to-air missiles
- M61 20mm six-barrel gun
- AGM-88A Harm antiradar missiles
- AGM-65A Maverick TV-guided air-to-ground missiles
- AGM-65D IIR infrared imagery missiles
- AGM-65C Laser-guided air-to-ground missiles
- AGM-84A Harpoon antiship missiles
- MK20 Rockeye bombs on multiple ejection racks
- Matra Durandal runway denial weapons
- MK82 500-pound bombs in *Slick* (low drag) and *Snakeye* (retarded flight) configurations
- MK84 2000-pound bombs in Slick, laser-guided, infrared-homing, and electro-optical versions
- GBU-12 Paveway laser-guided bombs
- GBU-24 Laser-guided bombs
- GBU-15 Laser-guided glide bombs
- Mk 20 Rockeye cluster bomb units
- GE 30mm gun pods
- Tactical nuclear weapons
- ASAT antisatellite missiles

Air-to-Ground

As you can see, the F-15 Strike Eagle is equipped to handle a wide variety of air-to-ground weapons, including laser-guided glide and free-fall bombs. For the purposes of your mission, however, the most important is the AGM-65 Maverick missile.

AGM-65 Maverick

Manufacturer: Hughes Aircraft

Propulsion: Thiokol solid rocket motor (reduced smoke)

Size: 98 inches long, 12 inches in diameter, 28-inch wing span

Weight: 460–700 pounds at launch, depending upon the warhead attached

Speed: Mach 1.2

Simulation: F-15 Strike Eagle II

Figure 2-4. The AGM-65 Maverick Missile



Hughes Aircraft won the contract in 1968 and continues to be the prime contractor. The original A version was a formidable weapon, and the system has been greatly improved over the years. The version you'll be using is the AGM-65D with an infrared seeker. Specially designed for use with the LANTIRN system, this version provides for maximum standoff capability and improved accuracy in rain and fog, and at night.

The A version uses the larger 250-pound blast/frag warhead as opposed to the original 130-pound shaped charge design. This allows the Maverick to be effective against small ships as well as land-based targets. Also, the Air Force has been investigating placing Tactical Nuclear Warheads on AGM-65 missiles.

Once the target is designated and locked, the missile is totally fire-and-forget. As soon as the missile is launched, the pilot is free to maneuver to avoid enemy fire or leave the area. No further guidance is needed.

Air-to-Air

The air superiority role should be very familiar to any F-15 pilot, as should the weapons involved. For air-to-air, the F-15E uses the standard Air Force combination of radar-guided weapons for medium range, and infrared seekers for short range. In this case, the AIM-9 Sidewinder, AIM-7 Sparrow, and AIM-120 AMRAAM missiles are carried.

AIM-9 Sidewinder

Manufacturer: Versions 9L and 9P, Ford Aerospace; versions 9L and 9M, Raytheon

Propulsion: Various manufacturer's solid rocket motor, reduced smoke

Size: Approximately 120 inches long, 22-inch span, depending upon version

Weight: From 172 to 190 pounds, depending upon version

Mission Time: 40–60 seconds for newer versions

Simulation: *F-15 Strike Eagle I and II*

Figure 2-5. The AIM-9 Sidewinder Missile



Conceived by the Naval Weapons Center, China Lake, in the 1950s, the Sidewinder has become one of the best and most influential missiles in history. The original version was the model of simplicity—it was said to have “only 24 moving parts, and fewer electronic components than the average radio.” This, of course, also meant low cost.

The modern Sidewinder is much more complex, but also much better. The breakthrough came with the 9L version, which has *all-aspect capability* (ALASCA). No longer must the missile be fired from behind the target at the hot tailpipe. The 9L version has a seeker that can pick up heat from air friction along the leading edges of the bogey’s wings and engine intakes. This head-on capability has given the U.S. a large advantage over the Soviets, who are just now developing all-aspect IR missiles.

Once the bogey is targeted and locked, the Sidewinder is a totally fire-and-forget missile. No further guidance is needed. The Sidewinder does tend to lock onto the nearest target, so care should be taken in crowded skies.

AIM-7 Sparrow

Manufacturer: Raytheon

Propulsion: Solid rocket motor

Size: 144 inches long, 8 inches in diameter, and a span of 40 inches

Weight: At launch, 452 or 502 pounds, depending upon the version

Speed: Mach 4

Range: Older versions, 28 miles; newer versions, 62 miles

Warhead: 88 pounds

Simulation: *F-15 Strike Eagle I*

Figure 2-6. The AIM-7 Sparrow Missile



One of the largest U.S. air-to-air missiles, the *Sparrow*, was designed for medium beyond-visual-range use. It uses SARH (SemiActive Radar Homing) guidance, which requires that the target be "illuminated" by radar from the fighter all through the flight. As long as the source fighter isn't forced to make wild maneuvers, it can illuminate the target. However, the problem comes when the fighter comes under enemy fire while the missile is in flight. Often, the fighter must maneuver to avoid a SAM launch, which can cause it to lose radar lock on the target.

This problem led to the development of the AIM-120 AMRAAM, which is similar in size and range but is a fire-and-forget type weapon.

AIM-120 AMRAAM

Manufacturer: Hughes Aircraft

Propulsion: Solid rocket motor

Size: 145 inches long, 7 inches in diameter

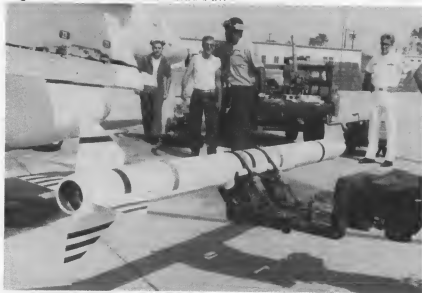
Weight: At launch, 363 pounds

Speed: Mach 4+

Warhead: Approximately 50 pounds

Simulation: F-15 Strike Eagle II

Figure 2-7. The AIM-120 AMRAAM



The AMRAAM (Advanced Medium-Range Air-to-Air Missile) was developed to replace the aging AIM-7 Sparrow series. Designed to be somewhat smaller, cheaper, and more reliable, the AMRAAM may eventually prove to be as popular and effective as the famed Sidewinder series.

It has advanced sensors that can detect a target at extreme range. Once launched, it doesn't need further guidance or target illumination by the firing aircraft, which frees the fighter to clear the area, concentrate on a second target, or maneuver for a second shot at the first target. The AMRAAM is undoubtedly the finest medium-range missile in operation. It has very good maneuverability and sophisticated electronics to prevent it from being fooled by enemy countermeasures.

Weapons in Recent Combat

- In 1981, two Libyan SU-22 Soviet-made fighters were downed by Sidewinders fired from U.S. Navy F-14 Tomcats.
- In 1982 in a series of massive dogfights over Lebanon's Bekaa Valley, the Israeli Air Force—flying F-15s and F-16s—shot down 85 Syrian jets plus a number of helicopters. Again, Sidewinders and Sparrows were used extensively.

- Later in 1982, 16 Argentine fighters were shot down by British Harriers using Sidewinders.
- The most recent incident was January 1989, when two U.S. Navy F-14 Tomcats were threatened by two Libyan MiG-23 Floggers. In a classic head-on confrontation, both MiGs were shot down.

When two early head-on Sparrow missiles missed, the F-14s split up. Both MiGs followed the wingman F-14 who pitched back into the MiGs and downed one with a second Sparrow shot. The lead F-14 turned back and closed in on the tail of the other MiG in a perfect bracket maneuver. Seconds later, he splashed the second Flogger with a Sidewinder shot.

Clearly, these weapons work and are effective. Of the two, the Sidewinder has been credited with many more kills than the Sparrow, the reasons being twofold.

- First is the problem of identification of targets beyond visible range, an area in which the Sparrow is most effective. Visual identification of enemy aircraft is the current order of the day in air combat to prevent shooting down a member of your own air force. Consequently, most jets are too close for Sparrows by the time they're identified.
- The second problem lies in the fact that Sparrows rely on semiactive radar detection for homing in on the enemy, which means that once the missile is fired, the F-15 must continue flying toward the target to bounce radar signals off it for the missile to follow. In combat with multiple opponents, it isn't always possible to concentrate on just one target for any length of time. The Sidewinder, on the other hand, is a fire-and-forget weapon. Once it's launched, the pilot is free to evade or attack.

The good news is that neither of these problems will plague you when flying missions for the Eagle Rapid Deployment Team; identification is rarely a problem. You're by yourself over enemy territory most of the time, so you can safely assume that any other aircraft are unfriendly. This isn't the case in *F-15 Strike Eagle II* however; many friendly aircraft may be in the area around friendly bases. The Sparrow missiles used in *F-15 Strike Eagle I* don't require attention once they're

launched. (Remember, you can't fire another missile until the previous one completes its flight.) Also, *F-15 Strike Eagle II* uses the AMRAAM missile, which is truly fire-and-forget.

F-15E Delivery and Competition

The first Air Force squadron to go operational with the F-15E was the 336th Tactical Fighter Squadron at Seymour Johnson Air Force Base in North Carolina. The future of the dual-role fighter, however, is in doubt since funding for the program was cut and production is set to stop in 1991. This will provide the Air Force with only 200 aircraft out of the original order for 392.

The main fear seems to be one of obsolescence. Many feel that even aircraft capable of operating at low altitude and high speed will no longer be safe from enemy SAMs in the near future, and that Low Observability Technology is the way to go. Also, the Air Force does have an aircraft in development—the ATF (Advanced Tactical Fighter)—that will incorporate stealth technology as a means of defense.

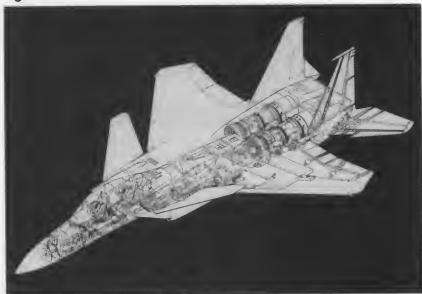
Unfortunately, in this age of budget cutting, who knows how long it will take to actually deliver the ATF. In the meantime, the F-15E is a good concept based on a rugged and proven airframe. Even if the ATF does come along, an aircraft capable of delivering 24,000 pounds of ordnance deep behind enemy lines day or night, good weather or bad, and capable of air-to-air combat with the best the enemy has, will certainly find a role in any future conflict.

Future Modifications

A 20-percent power increase is planned for 1991 when the F-15E will start to receive the new General Electric and Pratt & Whitney engines. This *increased performance engine* program (IPE) will up the power rating of each engine to 29,000 pounds of thrust.

Also in the works is a short takeoff and landing version of the F-15. This experimental aircraft will be able to take off or land on a bomb-damaged runway only 50 feet wide and 1500 feet long, in a 30-knot crosswind, with no active ground-based radar guidance.

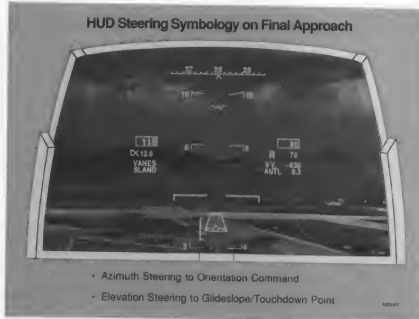
Figure 2-8



A cutaway view of the new F-15 S/MTD short takeoff and landing/maneuver technology demonstrator.

This aircraft is fitted with forward canard wings and thrust-vectoring and thrust-reversing engine nozzles. Also included is a new Autonomous Landing Guidance system that will assist the pilot in a number of areas, including setting the glidepath for landing and flare-maneuver guidance.

Figure 2-9



HUD symbology for the new Autonomous Landing Guidance system shows where to land on a damaged runway.



CHAPTER 3

Air Combat Orientation

Here, you'll learn about air combat-related flight physics, the pilot's mission, and the phases of an air battle.

Air Combat-Related Aerodynamics

This section serves as a refresher course in aerodynamics as they apply to flying your aircraft in combat. It isn't intended to be a complete course, just an overview of information that will enable you to understand the physics behind some of the maneuvers used in air combat, and how to use them to your advantage.

Energy Maneuverability

The concept of energy awareness during air combat is fairly new. Wise use and conservation of energy during combat will increase your chances of victory.

Your aircraft has two kinds of energy: *kinetic* and *potential*. Kinetic energy is related to airspeed. High levels of kinetic energy, or speed, are needed to perform many combat maneuvers. Potential energy is related to altitude and the force of gravity on your aircraft. If you have low speed (kinetic energy) but high altitude (potential energy), you can dive and pick up speed needed to perform a series of combat maneuvers. Conversely, if you have high speed but low altitude, you can convert this speed (kinetic energy) into altitude (potential energy) by climbing.

This combination of airspeed and altitude is often referred to as your *energy state*. The aircraft's ability to climb, dive, and accelerate to change this state is called *energy maneuverability*. So what does this mean to you in combat situations? To illustrate this concept, consider the following examples.

Example 1. You're at low altitude, down in the weeds, approaching an enemy aircraft at the same altitude head-on. You're flying considerably faster than your opponent. In a tight turning fight, the slower plane will have the advantage, but you're thinking in three dimensions. So as you approach, you pull up into a steep climb and your opponent pulls up after you. This is called a *zoom maneuver*.

Since you possess more kinetic energy (you're flying faster), you're able to climb higher and gain the advantage. He'll run out of airspeed first and be forced to dive to regain it. You can then pitch back and dive to get on his tail.

Example 2. You're following an enemy aircraft flying at the same speed as you, but you're at a higher altitude. As your enemy twists and turns in an effort to escape, he'll lose speed (kinetic energy). If you follow him through those turns, you'll lose speed, too. But, because you're at a higher altitude, you'll have more potential energy, so you can dive to pick up speed, catch the enemy, and maneuver into a good firing position.

What these examples mean to you, a fighter pilot, is that you must constantly keep an eye on your speed and altitude during combat. A heavy-handed pilot who twists and turns the aircraft around without paying attention to energy losses will soon be unable to maneuver. Once lost, energy is hard to regain; then your only hope is to dive hard and regain some speed (assuming, of course, you've left yourself enough altitude to perform this maneuver.) The lesson here is to avoid low altitude and low speed conditions. If you don't, you're a sitting duck for air-to-air or surface-to-air fire. Also, in this type of fight, it's easy to depart the flight envelope and stall. At low altitude, a stall generally translates into a smoking hole in the ground.

CAUTION

Always keep an eye on your airspeed in *low* altitude situations. Remember, the ground has a very high kill ratio.

A good rule of thumb is to maintain a high cruise speed (Mach .9 or so) and a good cushion of altitude (35,000 feet or so) when entering a combat situation. With this speed and altitude, you'll have all the options of climbing or diving at will. Just remember, this altitude can put you in a bad situation tactically on some missions, so the optimum situation isn't always appropriate.

Climb Performance

Your aircraft's ability to gain altitude, or *climb*, is hampered by weight and drag. The easiest way to improve your climb performance is to get rid of any unnecessary equipment. If you're going to concentrate on air-to-air combat, get rid of any bombs you're carrying. All that air-to-mud equipment only slows you down, making you more vulnerable.

If you have external fuel tanks that are empty, drop them, too (in the F-15 Strike Eagle, for instance, your external tanks are empty when fuel remaining is less than 13,500 pounds). Fuel tanks increase drag, hurting your ability to climb.

The F-15 has excellent climb performance when not loaded down with bombs and fuel. In this configuration, the F-15 is considered *ballistic* because it can produce more pounds of thrust than the plane weighs and therefore can accelerate straight up at full power.

For each aircraft, there's an optimum climb rate at which trading speed for altitude and altitude for speed is minimized. When performing a sustained climb, keep your airspeed in mind. If you climb too steeply, you'll use fuel faster and lose air speed, which will take some time to recover once you reach your desired altitude. If your climb is too shallow, it will take longer to reach your desired altitude.

Acceleration Performance and Unloading

Acceleration is primarily affected by weight and thrust. Kicking in the afterburner increases your speed somewhat, but the best way to pick up a lot of speed in a short amount of time is to dive.



Figure 3-1. Ballistic Climb

An F-15 in an air-to-air configuration (AIM-7 Sparrow and AIM-9 Sidewinder missiles) in a ballistic climb.

NOTE

A gentle, unloaded dive will produce the best acceleration performance in most situations.

The trick here isn't to push hard on the stick in an attempt to dive straight down, but to perform a maneuver called *unloading*. In unloading, you're removing the weight of the aircraft that slows acceleration.

To do this, push forward on the stick slightly to obtain a gentle dive. This starts a gradual dive and produces a *zero G condition*. This is similar to going over a small hill with a car or bicycle—as you go over the crest, you're momentarily weightless as you come out of your seat. The same thing happens when you unload an aircraft; however, an aircraft can continue to lose altitude and thus remain unloaded for quite some time.

Without the weight of the airplane holding it back, the speed of the plane can be increased rapidly. This can happen so quickly, in fact, that you need to keep your eye on the airspeed indicator to make sure you don't exceed the structural design limits of the aircraft, or *Vmax*. The *Vmax* of an aircraft is the maximum airspeed it can attain without ripping its wings off.

The F-15 Strike Eagle simulator gives a visual warning when you're approaching *Vmax*.

WARNING

When you see the *Vmax* warning, you should immediately cut power, extend your airbrakes, or pull up. (Make sure you already know which key operates the airbrakes, because you won't have time to look it up.)

Another method of increasing acceleration is to use a very steep dive. During a steep or *ballistic dive*, gravity greatly increases your aircraft's acceleration. In this case, if two planes are equal in all aspects but weight, the heavier plane will accelerate faster and achieve a higher terminal velocity.

If two planes are equal in weight but one has lower drag (because its shape is more efficient, or it's carrying fewer externals such as drop tanks or bombs), the one with the lower drag will have the acceleration advantage.

Even in this kind of steep or ballistic dive, it's best to perform the unloading maneuver first, and then progress to steeper dive angles.

Turning Performance

One of the most important performance characteristics of a modern fighter plane is its ability to turn sharply and to maintain a tight turn for an extended period of time. In most contexts, maneuverability and turn performance are synonymous. The better an aircraft's turn performance, the better it maneuvers. That, of course, translates into a better chance of winning a fighter/fighter contest.

Turn performance is generally divided into two types: instantaneous turn performance and sustained turn performance.

Instantaneous turn performance is an aircraft's ability to turn at any given point in time. This is a function of the aircraft's speed and altitude. As the term implies, the turn doesn't have to be sustained for more than an instant. Something called *maximum instantaneous turn performance* is achieved at very high speeds. Altitude is also a factor here since as you get higher, the density of air is reduced. The reduced amount of air passing over the wings reduces lift capability, which then reduces the turning performance.

Sustained turn performance is the aircraft's ability to maintain a turn for an extended period of time. Turn performance is measured three ways:

- *Load factor* or *G's* (gravity units) pulled during the turn. In a 5-G turn, the pilot weighs five times as much as normal.
- *Turn radius*, which is the area it takes to accomplish a complete turn. This is normally expressed in feet or miles.
- *Turn rate*, which is how fast the aircraft is changing course during a level turn. This is expressed in degrees of change per second.

The maximum G force an aircraft can handle is set by the manufacturer and normally allows for a significant safety margin. High-G turns can be performed at low and high speeds, but keep in mind that any time you're performing a maximum-G turn, all available lift is used just to maintain the current altitude. If you must climb, you'll have to reduce the angle and severity of the turn.

However, the aircraft's maximum-G turning ability isn't the most important factor to a fighter pilot. Turn rate and turn radius are more important because they determine the ability

of the aircraft to turn inside another plane, either to escape or to obtain the necessary lead angle for a shot.

Maximum turn rate and minimum turn radius can best be obtained in high-G low-speed turns. Normally the speed in these turns is just slightly higher than the stall speed for that aircraft. When turning this slow at maximum G, it becomes imperative that you watch your airspeed. A stall will send you rapidly toward the ground and disrupt any maneuver you're attempting. Once your airspeed begins to bleed off in these turns, you must decrease the G load in order to increase airspeed and prevent a stall.

NOTE

The most frequently misused control in a dogfight is the throttle. To maintain a high-G turn for a sustained period will often require you to gradually increase the throttle all the way to afterburner.

Care should also be taken when you're increasing thrust or decreasing G's during a turning fight. This can easily cause you to overshoot your opponent and quickly change your posture from an offensive one to a defensive one.

Roll Performance

Roll performance is the ability of the aircraft to change its plane (geometrically speaking) of operation—its ability to go from level flight to inverted flight or into a steep bank maneuver.

Roll acceleration determines how fast an aircraft can get into a steep banking maneuver or a continuous roll, and is a good measure of the aircraft's "agility." The aircraft that rolls the fastest has the advantage during a close turning fight.

Roll performance and roll acceleration are basically determined by the design of the aircraft, although roll acceleration can be increased by unloading the aircraft before performing the roll. Be sure to level out the plane after the roll to prevent an excessive loss of altitude.

Inverted Flight Performance

The F-15 has excellent inverted (upside down) flight performance characteristics. It's very steady and can even climb while inverted. Sustained inverted flight is rarely necessary in combat situations, but brief periods of inverted flight are necessary to perform many of the offensive and defensive maneuvers used in air combat.

Developing good inverted flight skills takes time and practice. All controls are reversed when you're flying upside down. To fly toward the ground, for instance, you pull back on the stick; to go up, you push forward. To execute a bank to the right, you must push the stick to the left. These skills should be practiced and perfected so you don't make the mistake of flying into trouble rather than away from it.

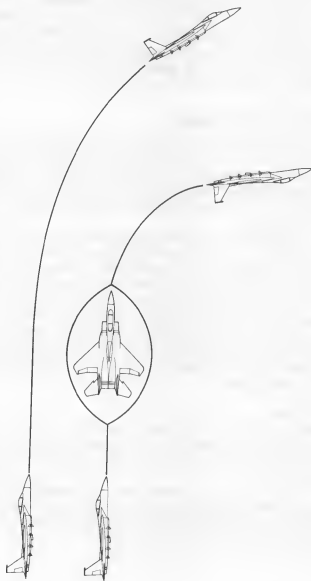
Jet aircraft wings are very efficient and provide a great amount of lift. When you need to dive in a hurry, this lift capability can be used to pull you down toward the ground by flying inverted and pulling back on the stick. This is an often-used escape maneuver. You not only dive quickly, but when you pull out, you're heading 180 degrees from your original course.

The Fighter Pilot's Mission

The jet fighter pilot's mission is to intercept, engage, out-maneuver, out-gun, and eliminate enemy aircraft. That's it, pure and simple. But as part of this team, you'll also be asked to strike enemy positions well behind the *forward edge of the battle area* (FEBA). Although you may be flying the hottest plane in the sky, remember your mission first. Once you've eliminated your assigned targets, you're free to go MiG hunting.

Any true fighter pilot will tell you there are two kinds of aircraft: *fighters* and *targets*. An aircraft that has anything to do with delivering air-to-ground weapons (bombs) is a target. Heavy bomb loads reduce maneuverability and speed as well as cause your aircraft to gulp fuel more rapidly. Therefore, it's in your best interest to hit your assigned targets quickly so you can get rid of your weapons load. With your load lightened, you become a very dangerous weapon, ready to go looking for trouble.

Figure 3-2. The Inverted Dive Advantage



Fighters sent up just to wait for trouble generally fly what's known as Combat Air Patrol (CAP). Fighters flying a CAP are configured strictly for air-to-air combat. F-15s on CAP usually carry Sidewinder short-range missiles, Sparrow medium-range missiles, and a Gatling gun or cannon. But as a member of this team, you won't have to wait around hoping that trouble stumbles into your path. You're sent out-looking for and causing your own trouble and action. If you don't relish the idea of testing yourself against the best the enemy has to offer, maybe you're in the wrong business.

Air Combat Basics

The aerial chess game of move and countermove, one plane against another, has been a difficult thing for experts to pin down over the years. The rules are constantly changing; what worked yesterday may not work tomorrow, or the latest technology may be defeated by an obsolete system in actual combat conditions.

Regardless of the level of sophistication of the equipment, however, the most important measure of a country's air power is how well the pilots can tactically maneuver to utilize and deliver the weapons available. It has been shown over and over that flying skills and aggressiveness can overcome more recently developed weapons and superior numbers.

Despite all these changes, certain basic principles have remained constant over the years. The effectiveness of an attack is basically determined by four criteria, which are listed here in order of priority.

Surprise

Although surprise isn't often possible with the F-15 Strike Eagle simulation, it can be accomplished by firing medium-range missiles early, as soon as an enemy aircraft is detected coming toward you.

Surprise can also occasionally be gained by detecting an enemy with long-range radar and making a wide, slow turn to position yourself behind the opponent. Once in the favorable position, accelerate and close fast.

CAUTION

In actual air combat, surprise has always been the dominant factor in victory. Four out of five defeated pilots didn't know they were under attack until it was too late to maneuver to safety. Stay alert.

Teamwork

Teamwork is the second most important factor. Unfortunately, you're all by yourself when flying your F-15 Strike Eagle simulator. You'll be responsible for carrying out your assigned mission totally by yourself, no wingman to watch your six. (However, two-person play with one flying the plane and the other operating the keyboard can greatly improve your chances for survival.)

Maneuverability

Historically, only one out of five kills has been made by outmaneuvering an opponent, but when you're involved in a low-speed turning dogfight, outmaneuvering suddenly becomes very important. Develop and practice your skills.

Weapons

As the lethality of weapons used in air-to-air combat has increased, the targets have become harder to hit due to their increased speed and maneuverability. All things considered, the current close-range missiles aren't much deadlier than the machine guns used during World Wars I and II.

Aerial Combat

Aerial combat can be broken down into five stages:

- Detection
- Closing
- Attack
- Maneuvering
- Disengagement

Although in actual practice some of these phases may be skipped, each needs to be examined and understood.

Detection

The earlier you detect the position and course of an enemy aircraft, the more time you'll have to form a battle plan and maneuver to a favorable position to attack or avoid.

NOTE

When you're not actively engaged in combat, dodging SAMs, or on a bombing run, always keep your radar in the long-range mode.

Closing

Once an enemy has been detected, you must make a decision whether or not to close. You must evaluate the damage condition of your airplane, the amount of fuel you have remaining, your current mission, and your weapons remaining in order to make this decision. In some cases, it's best to continue a bombing run or head for home.

If you do choose to attack, you should close as quickly as possible. Your direction of approach will primarily depend on the enemy's path in relation to yours. If the enemy aircraft is flying across your path or away from you, try to get close behind it as quickly as possible, before it has a chance to turn toward you.

If the enemy plane is coming directly at you, you can try for lateral separation for a turn back. If he won't let you, you must close head-on.

Attack

Getting off the first shot is important. With an F-15, this usually means a medium-range missile shot followed by an attempt to get behind the enemy plane to follow up with a Sidewinder missile or guns. Your best move is to attack from behind. If that isn't possible, the head-on approach is your next choice.

You must also decide which weapon to use. Medium-range missiles may be out of the question at this point due to the minimum-range requirements. If Sidewinders are chosen, care should be taken not to get too close during the attack. If the first-shot attack isn't successful, you'll move on to the next phase of air combat.

Maneuvering

If your long-range or rear surprise attack isn't successful, you must then try to outmaneuver your opponent. Decide beforehand what type of weapons you want to attack with and what type of flight plan you'll follow.

If you're at low altitude (below 2000 feet), a close-range turning fight is going to be tough. The energy you lose during this kind of flight can put your aircraft in a stall. You can quickly find yourself out of altitude, out of energy, and out of ideas. At low altitudes, it's best to keep your speed up.

At higher altitudes, a close-range, turning, gun attack is possible. Your first move for this type of fight is to cut your power to 75 or 80 percent, which gives you the best turning performance. You may need to increase power during a sustained turn to avoid stalling. Keeping your speed low also keeps the enemy in front of you—you're less likely to overshoot.

Turning Options

Once you decide to engage a bogey from head-on, you have a number of options when it comes to your opening move.

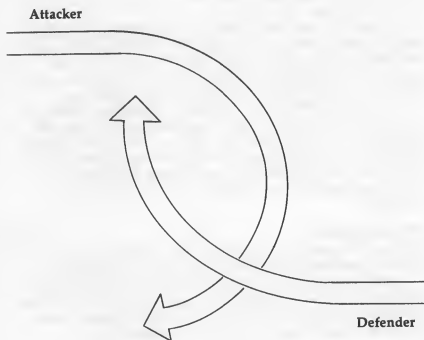
Lead turn. To perform this maneuver, put some lateral separation between yourself and your opponent; then turn early (before your opponent) toward the target. This will place you in an advantageous position behind the enemy.

CAUTION

This is a timing maneuver, don't turn too early or the enemy may have a chance to react and get right on your tail.

Figure 3-3. Lead Turn

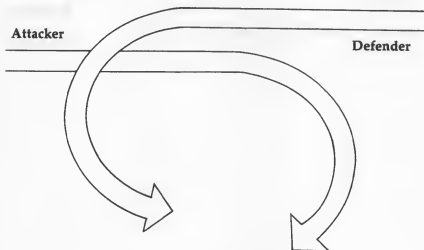
When an enemy aircraft is approaching, turn before he does—chances are, you'll end up behind him.



Nose-to-nose turn. In a nose-to-nose turn, you turn away from your opponent at the time you pass. This may be a good idea if you want to bleed off some airspeed and climb a little during the turn.

Figure 3-4. Nose-to-Nose Turn

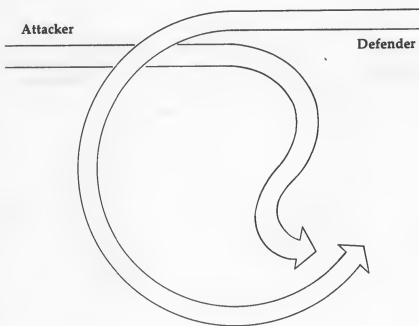
Turn away from your opponent to conduct a nose-to-nose turning maneuver.



If you've sufficiently reduced your speed, you may be able to reverse the turn once you spot the target, so you can fall in behind it.

Figure 3-5. Reversing During a Nose-to-Nose Turn

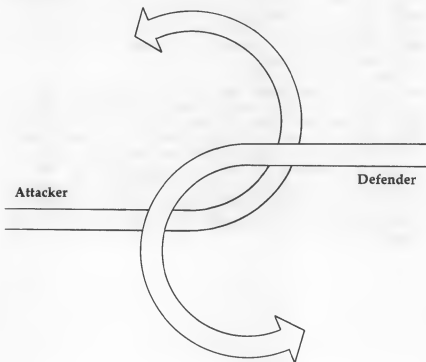
Reduce speed and reverse your turn, and you should be in a shooting position.



Nose-to-tail turn. In a nose-to-tail turn, you turn toward your opponent at the time you pass.

Figure 3-6. Nose-to-Tail Turn

The aircraft with the best turning performance will be in the shooting position.



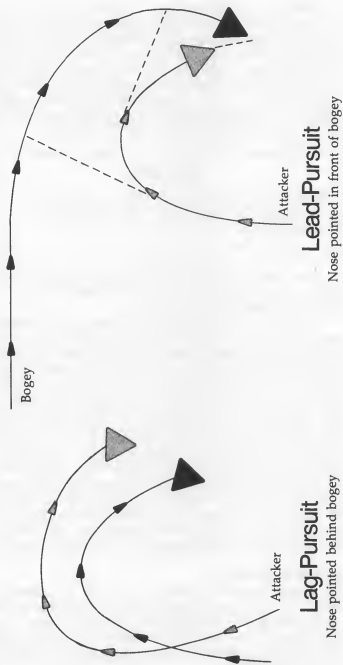
This puts you in a turning contest. You're chasing the bogey's tail and he's chasing yours. All things equal, the plane with the best turning performance will eventually catch up with the other and be in perfect position for a gun or short-range missile shot. However, pilots are rarely equal—just ask one. A clever pilot who knows how to manage his energy during the turning battle can frequently outmaneuver a lesser pilot in a more maneuverable aircraft. F-4 victories against the smaller and more maneuverable MiG-17s in Vietnam proved this.

Pursuit Options

The path you take when following a target is referred to as a *pursuit curve*. There are three kinds of pursuit curves: *Lag*, *Pure*, and *Lead*. Most rookies instinctively use Pure pursuit, in which they point the nose of their plane directly at the bad guy. This approach is okay, but seasoned pros know that Lead and Lag pursuit offer distinct advantages. Pursuit curves generally refer to one thing: where to point the nose of the aircraft. Following a Lead pursuit curve—keeping your nose ahead of the bad guy—assures that you can “pull lead” on the target for a good guns shot.

Here’s why pulling lead is so important. If you’re in a turning fight with another aircraft and you have your nose pointed directly at him, despite what you may think, he’s perfectly safe. You see, it takes a certain amount of time for the shells you fire to travel the distance between you and the target. By the time the shells get there, the target will be gone. It’s just like throwing a football to a running receiver: You don’t throw it to where the receiver *is*, you throw it to where he *will be* by the time the ball gets there. The same thing applies to gunnery: You must shoot where the target will be, not where it is.

Figure 3-7. Pursuit Curves



When you're following a target in a lead-pursuit curve, you have lead on that target. In other words, your nose is pointing in front of the target, not at it. This allows you to shoot where the target will be, not where it is. If you get into an engagement using lead pursuit from the beginning, you won't have to out-turn your opponent. Rather than flying straight at him, use the Tactical display or the TrackCam to see which way he's heading or turning; then approach him with your nose pointed in front of him, not at him.

CAUTION

Be careful not to lead the target too much or he'll simply reverse his course and put you on the defensive.

Lead pursuit will also allow you to close the range on a faster moving target by letting you "take a short-cut" and cut across the turning circle.

Lag-pursuit, or keeping your nose pointed *behind* the target, can be effectively used when you're trying to track a maneuvering target from the rear. In this case, trying to pull lead on the target may get you into trouble. What can happen is this: As you pull hard on the turn to get your nose ahead of the target, he reverses course and catches you going the wrong way. By keeping your nose pointed behind the target, he'll have to pass through your gunsights if he reverses course, giving you the chance for a quick guns shot. By maintaining a Lag-pursuit position, you'll also be able to maintain a speed advantage over the enemy. If he doesn't reverse, you may be able to force him into an ever-tightening turn. Sooner or later, he'll run out of airspeed or altitude and be forced to make a straight-line run for it. Then, you can use your speed advantage to close for a gun shot or to line him up for a missile.

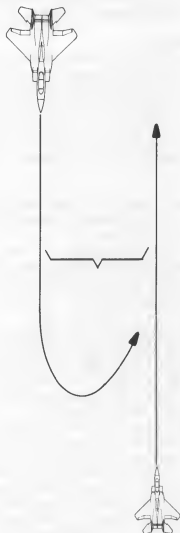
Lateral Separation

Use lateral separation combined with lead pursuit to attack those unsuspecting targets. Putting a little space between your flight path and the bogey's will make your turn and attack much easier. That way, you won't have to turn and race after him, and you'll be able to keep your nose in front of the target

the entire time. You can either maintain the lead pursuit until you close the range for a gun shot, or slide in behind him and put a Sidewinder up his tailpipe.

Maneuvering after the initial pass is discussed in detail later.

Figure 3-8. Lateral Separation



Disengagement

In the F-15 simulation, there's no real disengagement. The enemy fighters continue to follow you all the way back to the base, or until they're shot down. There are times, though, when it's necessary to put space between you and your opponent, to regroup or take a missile shot. These maneuvers are covered in detail in Chapter 9.

In *F-15 Strike Eagle*, as it has been historically, the best way to disengage from an enemy fighter is to shoot it down.

Situational Awareness

The term *situational awareness* became hot during and after the war in Vietnam, but the concept has been around since World War I. However, the concept is a difficult one to grasp. In general, situational awareness (SA) refers to a pilot's ability to keep up with what's going on in a rapidly changing environment. Not only must he keep track of the situation, he must also be able to use that information to predict what's about to happen.

Good SA requires you to think and feel in three dimensions and to be able to understand and keep track of various groups of time, distance, and relative motion as they apply to your aircraft and those around you.

As difficult as SA is to describe, it's even more difficult to teach. Experience helps, but not all experienced pilots have good SA. Some say that SA is more like a talent than a skill—hard work can improve it somewhat, but if you weren't born with it, there's little you can do to get it.

Stories abound from all the wars about pilots with great SA. They're the ones who finished off their targets in wild dogfights and then got on the radio to complement one of their squadron mates on *his* success. Their excellent SA allowed them to win their own engagements and keep up with several other dogfights simultaneously!

Oswald Boelcke was one of the great pilots of World War I. While he possessed great SA, he quickly realized that most of the new pilots being trained and sent to his squadron for combat possessed none at all. When friend and competitor Max Immelmann was shot down, Boelcke wrote a series of rules for air combat. While obviously intended for the novice, these contain a good deal of useful information applicable even in today's world of Mach-2 fighters and Mach-4 missiles.

Many of the rules deal with improving your own SA and reducing the enemy's.

Oswald Boelcke and the Eight Rules of Air Combat

Air combat has changed dramatically since World War I. Basic tactics and rules established by Oswald Boelcke in 1916, however, have stood the test of time well. These are eight rules of air combat designed to help new pilots survive and win.

1. **Try to secure an advantage before you begin your attack.**
This advantage can be altitude, position, or surprise.
2. **Always carry through with an attack once you've started.**
3. **Fire only at close range and when your opponent is properly in your sights.** When applied to missile attacks, this means shoot when in good position with a good angle and within the minimum and maximum firing ranges. When applied to guns, it means fill the screen with the enemy plane.
4. **Always keep your eye on your opponent. Don't be deceived by ruses.** In *F-15*, this means be prepared for your opponent to cut his speed to force you to overshoot.
5. **Always attack from behind your opponent.** This isn't as important now as it was in 1916, although it still applies to a good gun attack.
6. **When attacked, turn into the attack; don't try to evade.**
This still holds true. Always be on the offensive.
7. **When over enemy lines, never forget your own line of retreat.** When your fuel and/or weapons are low, start thinking about how you're going to get back to base.
8. **Attack in groups of four or six.** Unfortunately, you're by yourself in *F-15*.

This is the end of the ground training and familiarization section. Study this section and be prepared for anything the enemy can throw at you.

NOTE

Remember that air battles are lost, not won.
The pilot who makes the fewest mistakes wins.

PART II. ACM (AIR COMBAT MANEUVERING)

Now the real fun begins. Before you can perform complicated combat maneuvers, you must learn and perfect basic flying skills. Once you've done this, you can move on to offensive and defensive combat maneuvers. After covering a large portion of material, you'll be expected to demonstrate your flying proficiency in a checkride that calls for various flying skills.

NOTE

Each maneuver described in the ACM section includes step-by-step instructions on how to perform the technique, as well as any altitude or airspeed limitations.

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OF THE BOSTON BAR
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CHAPTER 4

Basic Flight Maneuvers

This chapter will help you learn and perfect basic jet fighter flying maneuvers—like the Barrel Roll, Split-S, and Break Turn—before you go head to head with an enemy aircraft.

Air combat maneuvering is the combination of a number of simple maneuvers that must be learned and mastered individually before you can combine them into more complicated offensive and defensive tricks. These maneuvers can be practiced during slack times while you're on a mission, or you can set up the simulation just to give yourself practice time.

F-15 Strike Eagle I

Simulation Setup for Air Training and Practice

Skill level: Rookie

Mission: #1, Libya

- Start the game and take off.
- Arm and fire a short-range missile at the MiG that pops up in front of you. If this doesn't destroy it, follow and fire a second missile.
- Fly the plane back out to sea, away from the land mass.
- Either place the NAV cursor over the base or use the Horizontal Situation Display (map) to guide you.
- On your way out to sea, drop all bombs. This will improve the performance and handling of the aircraft.

Once you've completed this checklist, you're ready to practice maneuvers. Should an enemy aircraft appear on radar or should a target-designator box appear on the screen, fire a medium-range missile immediately. If this missile misses, grit your teeth and go after the target. Keep in mind, the best way to learn to fight is by fighting.

F-15 Strike Eagle II

Simulation Setup for Air Training and Practice

Skill level: Rookie

Theater: Libya

- Start the simulation.
- Hold the Alt key down while pressing the T key to put the simulation in Training mode. Now enemy fire won't damage your aircraft.
- Arm and fire a short range missile to dispatch with the MiG that appears at the start of each mission.
- Turn and take a heading of 000, away from the land mass. If there's cloud cover on that heading, you can veer away from it or climb so that you're above the clouds. You'll need a good view of the horizon to practice your maneuvers. While holding down the Alt key, tap the S key several times to *Slew*, or transport, your aircraft to the north where you'll be able to practice in peace. This function only works in the Training mode.
- To improve the plane's performance, you can fire all air-to-ground weapons before practicing, but you should retain your air-to-air missiles to deal with any MiGs that show up to interrupt your valuable practice time.

Now you're ready to practice maneuvers. Feel free to use all the time you need. You may be approached by enemy aircraft after awhile. If one (or more) appears on radar, turn to face it and fire medium-range missiles at it.

CAUTION

Be sure to identify the aircraft before firing. Friendly military and commercial air traffic may be in the area.

NOTE

If you run low on fuel, press Alt-R to automatically refuel and resupply the aircraft.

NOTE

In *F-15 II*, if you don't want the limited mission results received during training to remain on the pilot's permanent record, you can use the Alt-Q command to quit the simulation before the results of your flight are permanently saved.

In the procedures that follow, the numbers in parentheses refer to the steps of the maneuver shown in the accompanying figure. The speed and altitude recommendations are just that—recommendations. Many of these maneuvers can be performed outside the stated limitations, but these limits give you safe starting points and guidelines while learning. F-15Es are expensive aircraft; see if you can finish your training in the same aircraft with which you start. It will make the commander very happy.

Aileron Roll

Minimum Speed: 300 knots

- Flying straight and level, pull the nose up slightly with one quick bump back on the stick (1).
- Apply full left or right stick and hold it. Don't pull the stick back or push it away from you at the same time (2).
- The horizon should begin to turn (3).
- After the horizon has turned completely around, stop applying pressure to the stick (4).
- You should try to pull out of the roll with your wings level (5). Anticipate.

If you've executed an Aileron Roll correctly, you should be on the same course when you finish as you were when you started.



The Barrel Roll

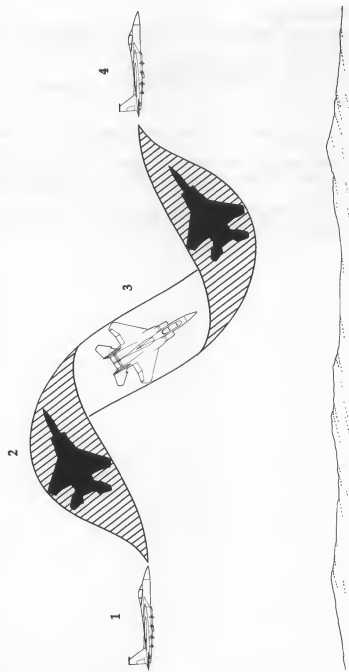
Minimum Speed: 400 knots

Minimum Altitude: 1000 feet

The main difference between a Barrel Roll and an Aileron Roll is that the nose of the aircraft stays level during an Aileron Roll. During a Barrel Roll the nose points up slightly during the first half of the maneuver, down during the second half, and then back level. This climbing and diving produces more drag; consequently, the Barrel Roll is used in many maneuvers to reduce the aircraft's speed.

- Flying straight and level, pull back on the stick to achieve a 30-degree climb (third indicator line). As soon as a 30-degree climb is reached, apply full right (or left) stick, still holding the stick back (at the 4:30 position). Hold this position (1).
- The plane should climb and roll inverted (2).
- You'll dive and roll out level (3).
- Stop the roll with your nose and wings level. Some forward stick toward the end of the roll may be necessary to bring the nose down (4).

Pull back on the stick to put the aircraft in a 30-degree climb; then roll the plane.



The Loop

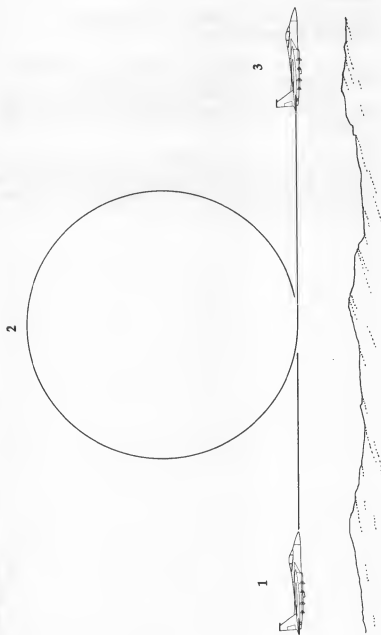
Minimum Speed: 415 knots (fully loaded); 320 knots (no bombs)

Minimum Altitude: 2500 feet

(You could lose approximately 1000 feet performing this maneuver.)

- Flying straight and level, pull straight back on the stick and hold it (1).
- The nose will rise until a complete loop is made (2). At the top of the loop, you're inverted and the horizon is below you.
- As the horizon nears level again, let go of the stick in an attempt to stop straight and level (3).

At the end of a Loop maneuver, you'll be about 1000 feet below your starting altitude.



The Break Turn

Minimum Speed: 100 knots above stall speed

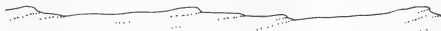
Minimum Altitude: None

(Watch your energy level—you may have to increase power to maintain this turn for more than a second or two.)

A break turn is used to change direction as quickly as possible. Often used to avoid missiles or to outmaneuver enemy aircraft.

- Flying straight and level, apply full left or right stick (1).
- Hold the stick until the horizon appears vertical. Now pull back on the stick. You're now in a maximum performance turn at 90 degrees (2).

To maintain a Break Turn for more than a moment, you'll have to increase power. If you're already at 100-percent thrust, hit the afterburners.



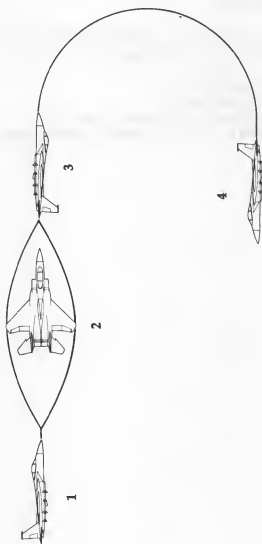
Split-S or Descending Half-Loop

Minimum Speed: None

Minimum Altitude: 10,000 feet (fully loaded on afterburners);
3,000 feet (no bomb load and 55-percent power)

A Split-S is used to quickly obtain a reverse heading and pick up speed and energy in the process. Make sure you have enough altitude.

- You're flying straight and level (1).
- Apply full left or right stick (2).
- Stop the aircraft's rotation once you reach an inverted position and you're flying straight and level upside down (3).
- Pull back on the stick and hold until the horizon comes up. Stop when the horizon is level (4).



The Split-S maneuver is one you can use to quickly lose altitude while making a 180-degree turn.

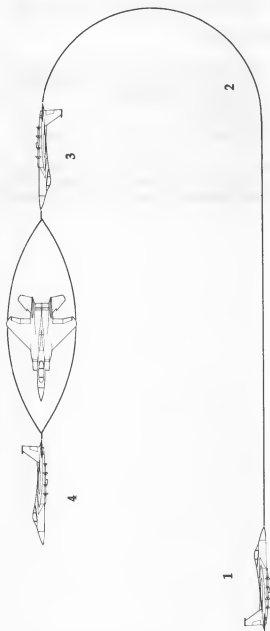
Vertical Half-Loop or Immelmann

Minimum Speed: 415 knots (fully loaded); 320 knots (no bombs)

Minimum Altitude: None

To reverse direction and bleed off excess speed or gain altitude, the Vertical Half Loop is recommended.

- You're flying straight and level (1).
- Pull back on the stick and hold (2).
- Let off the stick when you're flying upside down (3).
- Apply full left or right stick until the horizon comes around level (4).



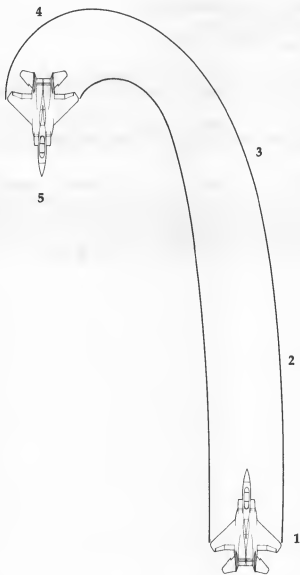
The Vertical Half-Loop, a maneuver that gains altitude and reverses your heading, is the opposite of the Split-S.

The Stall Turn

Minimum Speed: 500 knots (fully loaded); 400 knots (no bombs)

Minimum Altitude: None

- Pull back on the stick and climb until 90 degrees shows on the climb angle ladder on your screen (1). Climb straight up.
- As speed decreases, continue to climb (2).
- Cut power to 70 percent (3).
- The plane should stall and put you pointing toward the ground (4).
- Apply 100-percent power and pull back on the stick to fly straight and level, or continue to dive at your target. If you approach Mach 2, be prepared to extend your speedbrake (5).



You can stall your aircraft and use that as an element in this turning maneuver.



Inverted Flight Practice

Minimum Speed: None

Minimum Altitude: 1000 feet

- You're flying straight and level upside down (1).
- Push forward on the stick to obtain a 10-degree rate of climb (2).
- Pull back on the stick to obtain a 10-degree dive (3).
- Push forward on the stick to obtain straight and level flight (4).

All stick commands are opposite during inverted flight. This maneuver, as well as turning while inverted, should be practiced until the opposite commands become second nature. In a dogfight, inverted flight is common, and you don't want to turn the wrong way or dive into the ground.

Practice flying upside down to get comfortable with the way the aircraft responds to the stick.



Speedbrake Extension

Minimum Speed: 500 knots

Minimum Altitude: None

Extended use of the speedbrake at low speed or high altitude can cause your speed to drop to the stall point.

- You're flying straight and level (1).
- Extend your speedbrake. Notice how your speed drops to approximately 75 percent of its original level (2).
- Remove the speedbrake and notice how the plane quickly accelerates to its previous speed (3).

The speed brake is used often in combat to slow your speed in a hurry without slowing down the engine. It's frequently used to avoid overshooting an opponent. Once you've practiced this maneuver, you can try a speedbrake extension in a turn. Your speed will fall much faster due to the added drag of the turn.

Use the speedbrake to quickly decelerate.



ACM Checkride #1

This first checkride is just to get you comfortable following an enemy aircraft and keeping him in your sights. Doing this will require using many of the basic maneuvers you've learned—rolls and turns as well as wise use of the throttle and speedbrake.

Simulation Setup for Checkride #1

(Setup and objectives are the same for both versions of F-15 Strike Eagle. You may choose to use the Alt-T function in F-15 II to set the game to Training mode.)

Level: Rookie

Mission: Libya

Objective: To keep the enemy in your sights for at least 30 seconds.

Procedure: When you start the simulation, a MiG should appear in close proximity to your position. Pull behind the bogey and try to stay on his tail and keep him in the circle on your HUD. When you've been on his tail for 30 seconds, feel free to down the bogey with a missile shot or guns, and then return to the base.

When you can successfully complete this ride on the rookie level, move up to the next level and try it again. It will be harder on the next level, as the enemy pilot will use vertical climbing and diving maneuvers to try and shake you. Be prepared to use the afterburners to keep from stalling in a climb and the speedbrake to keep from overshooting in tight turns. Keep the bad guy in front of you at all times.

CHAPTER 5

Advanced Maneuvers

When a dogfight starts, one of three conditions exist: You have the advantage and are attacking, you're on the defensive, or you start with a head-on pass and neither plane has the advantage. Here, we'll discuss how to handle all three conditions.

Now that you can do all sorts of incredible things with your jet fighter, it's time to put those things to use. Use the simulation setup described at the beginning of the last chapter to practice these maneuvers.

Each maneuver described in this chapter outlines the conditions under which the maneuver should be used. This doesn't mean these particular conditions are the *only* appropriate times to use the maneuver, however. Experiment and find out what works best for you. Most fighter pilots have one or two favorite maneuvers with which they feel most comfortable, so they try to force the battle to become the kind of fight they fight best.

Be aware of your energy level at all times. Pay particular attention to this when you're at low altitudes where it's best to use high-speed maneuvers rather than hard-turning maneuvers that bleed off energy and make you choose between disengagement or crashing.

Offensive Maneuvers

As Boelcke said, once you start an attack, carry it through to the end. These maneuvers will help you do just that. If you start the fight with an advantage, use one of the following to set up the bogey for the kill. Remember to watch your speed, and don't overshoot.

Low Yo-Yo

Situation: You're in a hard-turning, low-speed fight. You're too close for short-range missiles but you can't out-turn the enemy to line up for a gun shot.

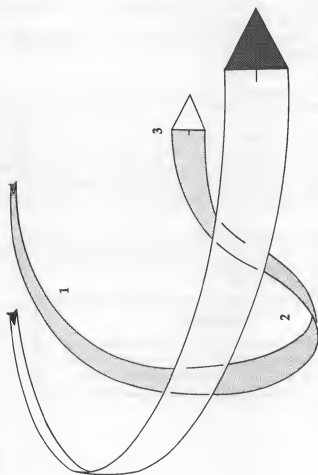
Maneuver:

- Let your upper wing come over, and begin an inverted dive (1). The speed you gain in the dive will let you hold a tight turn toward the bogey without stalling.
- Roll out in the opposite direction and pull the nose up (2).
- Repeat the process until you pull in behind the enemy and can line up a gun shot (3). Be quick on the trigger and ready to fire as you pull up each time. Firing parameters may be met for only a second or two.

NOTE

This maneuver should not be performed at low altitude.

Drop down inside the other aircraft's turn; then pull in behind for a possible shot.



High Yo-Yo

Situation: You're closing rapidly on a turning target from the side or rear. You want to:

- Avoid overshooting the target and losing your offensive position due to your greater speed.
- Obtain a better position behind the target for improved heat-seeking missile tracking.

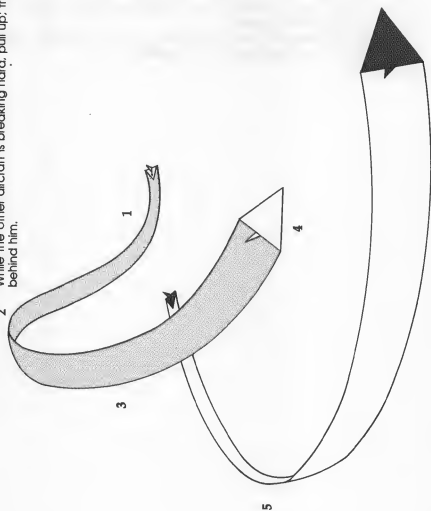
Maneuver:

- Level your wings and pull up to gain altitude (1).
- Begin turning toward the target, remaining above and behind (2).
- At this point, start an inverted roll and dive at the target (3). You have two options here: You can point your nose slightly ahead of the target and take a Lead-pursuit path to make a diving guns pass, or you can come around behind the target for a heat-seeking missile shot directly at the target's tail-pipe (4).
- If the target reverses its turn at position 5, you should get a clean shot at its tail. If you fail to destroy the opponent, or if you miss, another High Yo-Yo or a Low Yo-Yo will return you to an attacking position.

WARNING

Be careful not to bleed off too much speed during the climbing portion of this maneuver or the bogey may be able to accelerate out of range.

2 While the other aircraft is breaking hard, pull up; then pull down to get behind him.

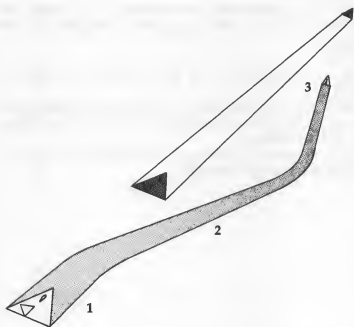


Straight Yo-Yo

Situation: The enemy aircraft is making a break for it, trying to outrun you. In this situation, if you don't want to use your afterburners because your fuel level is low, you can trade altitude for speed.

Maneuver:

- Obtain a position directly behind the enemy aircraft (1).
- Remaining directly behind your opponent, begin a shallow (10- to 20-degree) dive (2).
- Notice your airspeed rising. As you close on the enemy, pull up to slow down and prevent an overshoot (3).



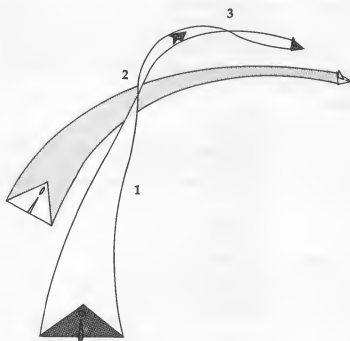
Trade altitude for speed by going into a shallow dive and then pulling up when you're within range.

Barrel Roll Attack

Situation: You're approaching an opponent from behind. The other aircraft turns hard, and your speed advantage may cause an overshoot.

Maneuver:

- The enemy aircraft breaks hard to the right. You should pull up hard (1).
- Immediately begin a Barrel Roll to the left, away from your opponent (2). This should cause you to bleed off some speed so you don't overshoot.
- Finish the maneuver by sliding back in behind the enemy plane with a hard right turn (3).



Instead of overshooting, pull up and roll away from your opponent. Slide back into firing position with another turn—this time toward the target.

Zoom Maneuver from a Turn

Situation: You're in a hard-turning fight. You can't obtain an advantage, and you're too close for a missile shot. Both you and your opponent are at low speed. The object here is to use your high thrust-to-weight ratio to perform a steep climb so you can get enough distance between you and the enemy to use your missiles.

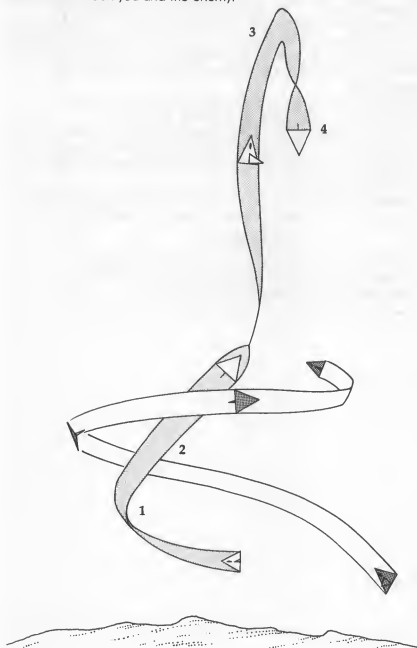
Maneuver:

- Fire your afterburners (1).
- Execute a very steep climb (2).
- Continue until you've climbed 5000 feet or so. Throttle back your engines and perform a stall turn (3).
- As soon as your opponent comes into view, fire a short-range missile.

CAUTION

While climbing, you may present your opponent with a good missile shot. Take an occasional look out the back and try to time your zoom so that the bogey isn't in a position to shoot.

Your jet can perform a ballistic climb. Use this advantage to put some distance between you and the enemy.



Dive for Separation for a Missile Shot

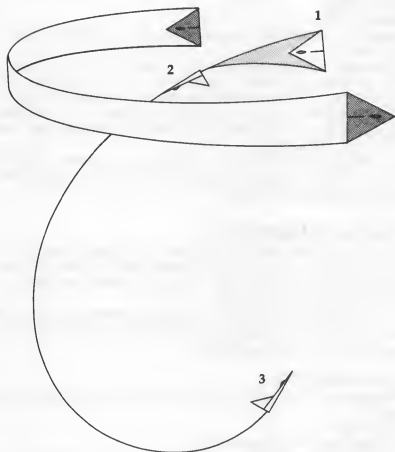
Situation: You're in a very close, hard-turning fight and you've climbed to high altitude in the process. You're too close for a missile shot, but you can't line up your hard-maneuvering opponent for a gun shot. This maneuver puts distance between the two of you for a better chance at a missile hit.

Maneuver:

- Bank hard and try to pull inside the enemy's turn (1).
- Roll inverted, pull back on the stick and dive (2).
- Keep the nose pointed straight down until you've lost 10,000 feet or so. Then pull back hard on the stick and keep it pulled back until you pull out of the dive and head back up toward the target.
- Locate the enemy aircraft and fire a short-range missile (3).

CAUTION

Diving with afterburners on will cause a rapid loss of altitude and may cause you to exceed the maximum design speed for the aircraft.



Another way to separate from the enemy (and thus have enough distance to use a missile) is to dive away before firing.

ACM Checkride #2

The purpose of this checkride is to let you demonstrate that you've learned to finish off an opponent when you have the advantage.

Simulation setup: Setup and objectives are the same for both versions of *F-15 Strike Eagle* except where noted.

Level: Pilot

Mission: Libya

Objective: To achieve success using all the maneuvers just discussed.

Procedure: Start the simulation and take off. A MiG should appear close by, but out in front of you. Let him go for a second or two; then use one of the offensive maneuvers to get back on his tail and shoot him down with either a short-range missile or guns. After a successful attack, restart the simulation and try a different tactic.

When you find a maneuver that works well for you, practice it until it becomes second nature. Every great fighter has one good knock-out punch.

Defensive Maneuvers

This section offers you several defensive options you can use to turn the tables in those tight spots. Don't be afraid to use the pause feature of *F-15 Strike Eagle* to review your options if you find yourself in trouble.

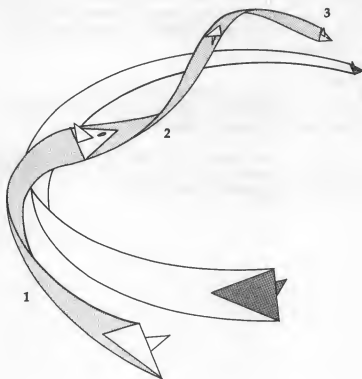
Attempt various escape techniques, and try to find one or two you feel most comfortable with. Practice and perfect those maneuvers for the best results.

High-G Barrel Roll

Situation: An enemy aircraft is close behind, closing for a gun attack.

Maneuver:

- Break hard into the attack (1).
- Perform a Barrel Roll in the opposite direction. This could bleed off some speed and make the attacker overshoot (2).
- Roll in behind the target for a gun or short-range missile shot (3).



Do a Barrel Roll away from the enemy; then roll back behind him for a tailpipe shot.

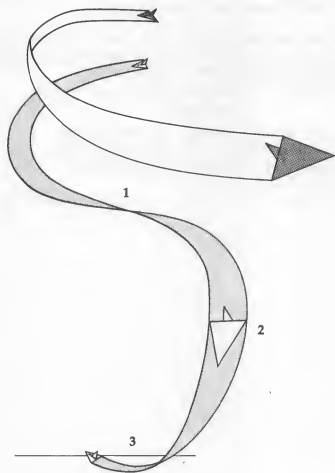
Disengagement

Situation: You're in a low-speed, hard-turning fight and can't gain an advantage after several turns. Sometimes the best maneuver is to disengage and reposition to attack again under better conditions.

Maneuver:

- Roll inverted (1).
- Pull back on the stick to start a steep dive (2).
- Keep the stick pulled back until you pull out right-side up but heading in the opposite direction (3).

Timing has a lot to do with the success of your disengagement attempt. If possible, make your move in one direction when the bogey is headed in the other.



Roll upside-down and put your fighter into a steep dive. You'll end up with a heading 180 degrees from your original.

Speedbrake Reversal

Situation: An attacker is closing fast from behind.

Maneuver:

- Level out your wings (1).
- Cut your engines, pull up hard, and extend your speedbrake (2).
- As soon as the attacker appears on your screen (overshoots), retract the speedbrake and be prepared to turn hard to follow, or take a missile shot and disengage.

You must be quick to react on this one; the bogey won't like being out in front of you and will turn hard very quickly. You'll only have a good shot for a split second.

CAUTION

Using a speedbrake reversal with less than 400 knots of airspeed won't leave you much speed for maneuvering. Use this with caution when flying at low speed.

Force the other aircraft to overshoot by extending your speedbrake.

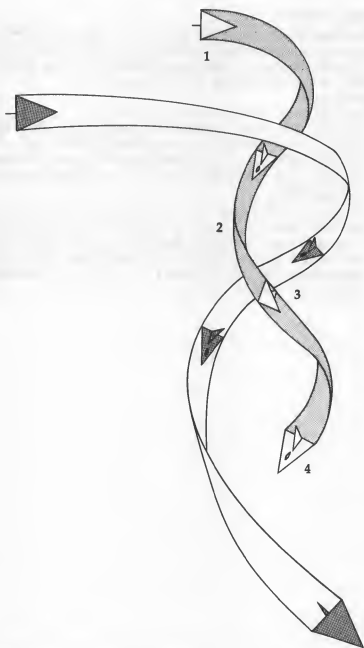


Defensive Spiral Dive

Situation: An enemy aircraft has closed to within firing distance behind you. You have at least 15,000 feet of altitude, and you want to (a) disrupt the enemy's aiming process, (b) escape, and (c) if possible, reverse the situation.

Maneuver:

- Roll to an inverted position (1).
- Pull back on the stick to start the dive (2).
- Determine the position of the attacker (3).
- Begin rolling toward the attacker. In other words, if he's to your left, push the stick to the left (4).
- As your speed builds, cut power to idle and extend your airbrake.
- If the attacker follows you down, he may overshoot at this point and allow you to take a shot.



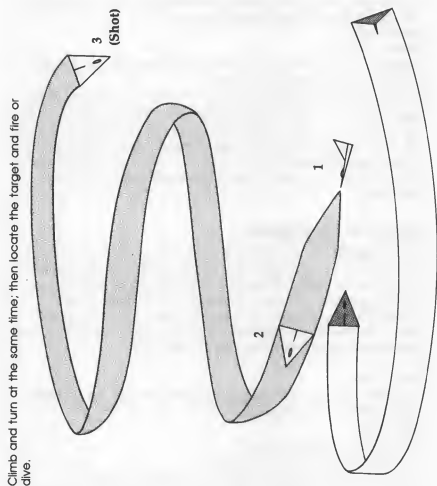
There's a chance the attacker may overshoot if you use this spiraling maneuver.

Vertical Spiral

Situation: You're being out-turned by an enemy aircraft. Your opponent is pulling around behind you. The Vertical Spiral lets you take advantage of the excellent design of your aircraft—the F-15 can climb while it's in a hard turn.

Maneuver:

- Pull the nose up to a 30-degree climb (1).
- Roll into the attack and light your afterburners. Hold this climbing turn until you've gained 5,000–10,000 feet or so in altitude. Most air-to-air missiles fired at you will be from behind during this maneuver and can be defeated with a properly timed flare (2).
- Cut your afterburners. Locate the enemy and take a missile shot (3). Depending upon the quality of the enemy aircraft, he may or may not be able to follow you up. Also your F-15 may have a higher ceiling (max altitude) than some of the older enemy aircraft, allowing you to gain an advantage even if they try to follow you up.



ACM Checkride #3

This ride will let you practice getting out of bad situations.

Simulation setup: The setup is the same for both versions of F-15 Strike Eagle unless otherwise stated.

Level: Pilot

Mission: Libya

Objective: To reverse a defensive situation into an offensive situation and destroy the bogey.

Procedure: Start the simulation and take off. A MiG should appear close by. Continue to fly straight and climb to 10,000 feet. Allow the bogey to follow you and come around on your tail. Now use one of the defensive maneuvers to attempt to reverse the situation. Repeat this drill, each time allowing the bogey to get closer to your tail before attempting to escape and attack.

Head-On Maneuvers

Many dogfights start from a neutral head-on pass after both parties have survived an initial missile exchange. Remember, it's mission first. You always have the option of not turning and fighting after a head-on pass. If you're close to your ground target, you may want to consider this option, but if you do choose to go toe-to-toe with the bogey, here are a few moves that might help you gain the advantage.

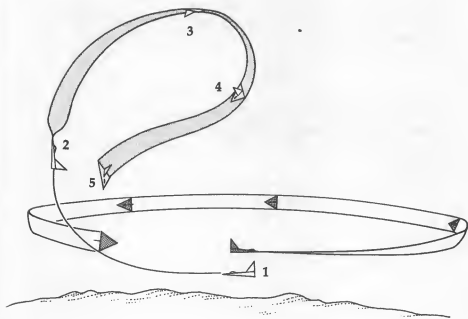
Pitch Back

Situation: You're attacking your opponent head-on with at least 500 knots of airspeed.

Maneuver:

- You're in a head-on pass (1).
- Pull up into a loop maneuver (2).
- At the top of the loop, keep the stick pulled back (3).
- When you're heading straight toward the ground, start to turn toward the enemy while pulling out of the dive (4).
- Instead of finishing the loop heading in your original direction, you've turned on the way down and should finish in a hard turn behind your opponent (5).

This kind of maneuver is called an *out-of-plane*—you're maneuvering in the vertical plane while your opponent is in a flat turn. This is a very good opening move if you suspect you can't out-turn your opponent due to greater airspeed. Use your energy advantage to go vertical.



This maneuver looks tricky—and it is. Pull back hard on the stick, loop, and then turn behind the target if it's there.

Head-On Gun Attack

Situation: You're approaching enemy aircraft head-on. You're too close for a missile shot, but you can still take a guns shot before he flashes past you.

Maneuver:

- Line up with the enemy straight ahead, at the same altitude (1).
- Start firing when the enemy is approximately 1½ radar screen divisions away. The target will fly to meet the gun shells. If you wait until the enemy aircraft is within normal gun range, you'll fly past before you get a good shot (2).

NOTE

A head-on attack presents a bad missile angle for your opponent. If you make the enemy pilot waste one of his missiles during the head-on pass, so much the better. Be prepared to jink, though.

Advanced Maneuvers



Fire while the enemy aircraft is still out of range in a head-on cannon attack.

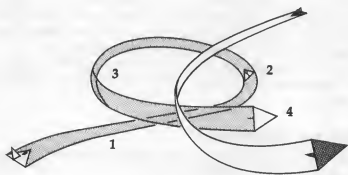
Head-On Turning Attack

Situation: You're approaching an opponent head-on at slow speed (400–500 knots). This speed allows maximum turning performance, which is to your advantage. Remember to increase the throttle during the turn to prevent a stall.

Maneuver:

- Head slightly to one side of your opponent to get some lateral separation during the initial pass (1).
- Turn hard toward your opponent as you pass (2).
- Maintain this maximum-G turn. You may need to increase power during the turn to keep your speed up to 400 knots (3).
- If you can out-turn your opponent, you should get a missile shot (4).

This isn't a long-term maneuver. If you don't gain an advantage fairly quickly, be ready to disengage or attempt another maneuver, such as a Low Yo-Yo. Spinning around and around with a single bogey will likely draw a number of his buddies to the area. Don't get so wrapped up that you let another bogey come in and gun you down.



Your turning performance must be better than your opponent's for this maneuver to work.

A Series of Low Yo-Yos

After a head-on pass, you can use a series of Low Yo-Yo maneuvers (described and illustrated earlier) to pull around on the tail of the bogey. This maneuver can be used even if you don't have a turning advantage over your opponent.

Yo-Yo maneuvers are some of the best moves you can learn. Master them, and they'll come in handy in a number of situations.

ACM Checkride #4

Head-to-head maneuvering can be difficult to master. This ride gives you a chance to practice your moves.

Simulation setup: The setup and objectives are the same for both versions of *F-15 Strike Eagle* except where otherwise noted.

Level: Pilot

Mission: Libya

Objective: To start out in a neutral head-on fight and gain the offensive and destroy the bogey.

Procedure: Start the simulation and take off. Light your afterburners and turn and accelerate away from the MiG that's in the area. Once you're several miles away, reduce your throttle, make a wide turn, and face the MiG in a head-on pass. Jink or decoy any missiles fired by the bogey, but hold your missile fire until after the first pass.

During your missions, you'll want to avoid this type of fight if at all possible. History shows that most successful air victories have come from ambush. Attack from long range whenever possible, and only get into tight turning battles as a last resort and on your terms.

PART III.

SOFTWARE ORIENTATION FOR THE ORIGINAL VERSION OF *F-15 STRIKE EAGLE*

The original version of *F-15 Strike Eagle*, released by MicroProse back in 1985, set the tone and style for future military simulations. A huge success, it put MicroProse on the map and provided a solid base from which it grew into the multimillion dollar company it is today.

This section will introduce you to special tactics that work particularly well with the original *F-15 Strike Eagle* only. It also provides general hints, tips, and information on improving your scores. The final chapter in this section presents one winning strategy for success in each of the seven mission scenarios.

CHAPTER 6

Winning Tactics for the Original *F-15 Strike Eagle*

Tactics that work particularly well with the original version of F-15 are described and explained in this chapter.

Weapons Use

Air-to-Air

Your internal cannon is a formidable weapon. When properly used, it can reach out and hit the enemy at extreme ranges.

Head-On Gun Attack

Situation: You're approaching enemy aircraft head-on.

Maneuver:

- Line up with the enemy straight ahead at the same altitude (1).
- Start firing when the enemy is approximately $1\frac{1}{2}$ radar screen divisions away. The target will fly to meet the gun shells. If you wait until the enemy aircraft is within normal gun range, you'll fly past before you get a good shot (2).

NOTE

A head-on attack presents a bad missile angle for your opponent. If you make the enemy pilot waste one of his four missiles during the head-on pass, so much the better. Be prepared to jink though.

Winning Tactics for the Original F-15 Strike Eagle



Fire while the enemy aircraft is still out of range in a head-on cannon attack.

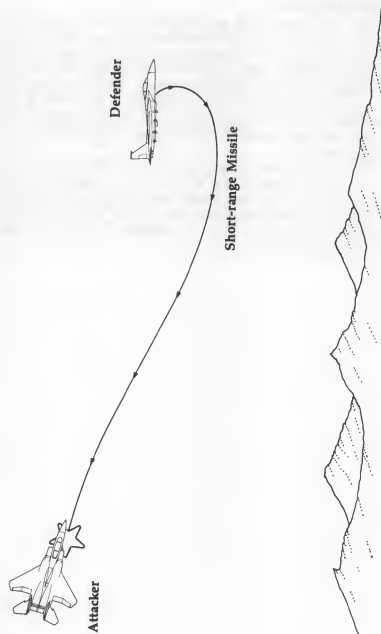
Firing a Short-Range Missile at a Target Behind You

Thanks to the game programmers, your F-15 missiles can track and attack targets behind you. Learn to use this special capability.

Situation: There's an enemy aircraft behind you, flying at roughly the same speed. You can't outmaneuver it. Your opponent isn't closer than a half mile or farther away than two miles.

Maneuver: Fire a short-range missile; then break away hard from the attacker.

It's possible to fire a missile at an enemy aircraft behind you.



Air-to-Ground

If air-to-air combat can be described as an art, then air-to-ground bombing is more a science. Get the proper angle and proper altitude, put the pipper (sight) on the target, and hit the bomb release. Bombing in *F-15 Strike Eagle* is much simpler than bombing with the real thing. Actual bombing runs are very precise with dive angle, airspeed, and altitude all predetermined by the type of ordnance you're dropping. If you're a little too fast, your load will land long; too slow and you'll come up short.

With *F-15 Strike Eagle*, however, you can bomb at any speed or dive angle and at altitudes up to approximately 3000 feet. You can drop bombs with your wings at any angle, even while flying inverted (this is a real test of your inverted flying skills). As long as you put the pipper on the target triangle, you'll score a hit.

There are two basic techniques you can attempt on a bombing run. Whichever you choose, start your run at 100-percent power. Rapid maneuvering to avoid surface-to-air missiles or enemy fighters can use precious energy. When you're delivering bombs at 2000 feet, you can't afford to let your energy level get low. A stall at low altitude can mean the end of your mission.

During any bomb run, keep an eye out for enemy fighters. Should one appear while you're on your approach, immediately arm and fire a medium-range missile. This will keep the enemy fighter busy and let you complete your run.

NOTE

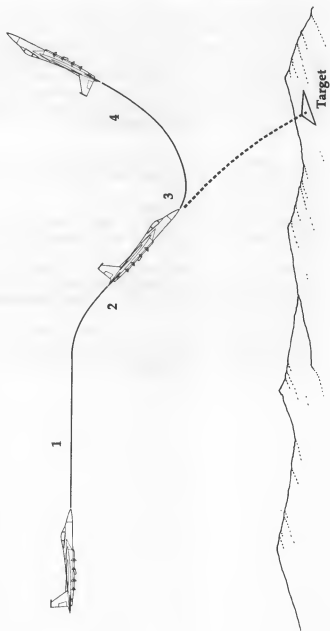
You can drop more than one bomb load on a target during a single bomb run to increase your point total. All must be dropped before the target is destroyed, however, to count as hits.

Dive Bombing

The standard bomb delivery technique is *dive bombing*. A dive bombing checklist should read like this:

- Check that you're at 100-percent power.
- Go to 4000 feet (1).
- Line up on the NAV indicator on the screen (assuming you've already positioned the NAV cursor over the target). Place the NAV indicator as close as possible to the center of your screen to reduce last-minute maneuvering.
- When the blue target-designator triangle appears, arm your bombs.
- Make any last-minute course adjustments and begin a 30-degree dive. The horizon should be level and on the third indicator line (2).
- When the bomb sight is well within the target area, release the bombs (3).
- Pull out of your dive (4).

Pinpoint dive bombing is a skill you'll need to practice.

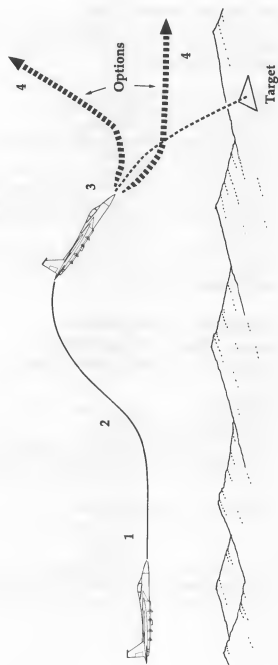


Pop-Up Bombing

The second method for delivering bombs, frequently used in high-threat situations, is the low-level or *pop-up* approach. If there are no enemy fighters around, approaching the target at approximately 1000 feet may give you some protection from radar-guided SAMs. The missiles should pass right over you. Flying at this altitude takes constant attention, though, since turbulence will constantly buffet your aircraft. A pop-up bombing checklist should read like this:

- Check that you're at 100-percent power.
- Place the NAV cursor over your target. Line up on the NAV indicator on the screen.
- Set your radar to medium-range scale.
- Descend to 1000 feet and arm your bombs (1).
- When the target appears on radar, immediately climb to 2000 feet (2).
- When you reach 2000 feet, or the blue target indicator appears on the head-up display, start a 30- or 40-degree dive (whatever it takes to place the pipper in the triangle) and release the bombs (3).
- At this point, you can return to the 1000-foot level to attack another target, or light the afterburners and head for home or the safety of high altitude (4).

Use this pop-up bombing technique when you want to fly in under the enemy's radar.



High-Altitude Dive Bombing

If you're coming up on a target you want to bomb at high altitude, you don't have to pass it by. Such a target can be hit by following these guidelines:

- Cut power to 55 percent.
- Line up the target directly in front of you.
- Set the radar to the shortest range.
- When the target appears on the radar, activate the bomb sight and start a steep dive.
- Keep track of your progress by watching the radar screen. Adjust your dive if necessary to prevent passing the target.
- The target triangle should appear on the ground as you pass 10,000 feet. If it doesn't appear, you've probably passed over the target.
- Drop the bombs and/or pull up at 3500 feet. If at any time during your dive you lose control, extend the speedbrake to stabilize the aircraft.

Defensive Considerations

Jinking a Missile Coming Head-On

Situation: Radar shows a missile heading toward you from in front.

Maneuver:

- Determine if the missile is heat-seeking or radar-homing. Head straight toward it (1).
- When the missile is 1 to 1½ radar grid divisions away (approximately 10–15 miles), release the proper countermeasure (flare for heat-seeker, ECM for radar-homing). Pull up hard (2).
- Watch the missile pass beneath you (3).

NOTE

Missiles fired from behind you will usually head for a released flare without the jink maneuver.

You have a good chance of dodging an oncoming missile with this simple maneuver.



Avoid Enemy Overflight

Radar isn't the only way the enemy can locate you. It can also "see" and "hear" you if you fly too close to an enemy location. Therefore, if you don't intend to bomb a target, it's to your advantage to fly around it rather than directly over it. Otherwise, you may have a lot of company.

On the other hand, if you're looking for trouble, flying over an airfield should generate a lot of action.

Multiple Bogey Situations

Sometimes you'll face two opponents, not just one. Learn how to handle them both and survive.

Occasionally, two enemy aircraft will appear on your radar. Both may even fire missiles at you. What you do at this point depends on a number of factors:

- Your altitude.
- Your energy level.
- Your mission: Are you closing on a bombing target?
- Weapons available: Don't attack two planes when you have only one missile left.
- Number of bombs carried: Speed and maneuverability both suffer with heavy bomb loads.
- Fuel left and distance to base.

Two against one is a serious situation, and you must weigh all these factors before choosing your course of action. Depending upon your situation, you'll take a *totally defensive*, *cautiously aggressive*, or *totally aggressive stance*.

Totally Defensive

When entering into an attack on two opponents, you're violating Oswald Boelcke's first rule of air combat: *Always attack with an advantage*. Reconsider if you have several other factors against you, such as low fuel or control problems due to previous missile hits. If you decide to make a run for it, here's what you should do:

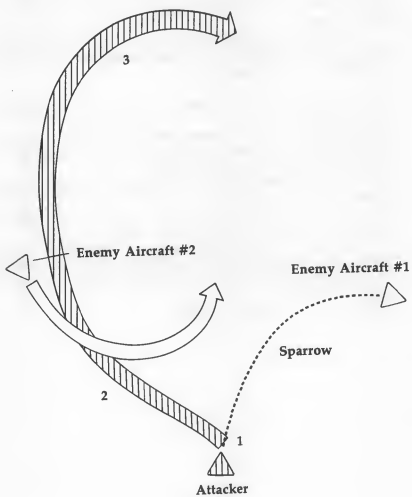
- Drop all bombs.
- Fire a missile at one of the targets, even if you're out of range—you may get lucky.
- If you have the necessary altitude, perform a Split-S and begin an unloaded acceleration toward base (use the afterburners if you have enough fuel).
- If you're at low altitude and have plenty of fuel, use your afterburners either to escape at low altitude or go straight up and hope they can't follow you.

Cautiously Aggressive

To attack two opponents, your aircraft must be undamaged and you should have adequate fuel and weapons. But maybe you're still carrying bombs you'll need for a ground attack later; now is a good time to consider a cautious attack.

- Arm and fire a medium-range missile at one opponent (1).
- Light the afterburners and fly head-on toward the second aircraft, offering the worst possible missile target (2).
- Pass beneath the enemy and try to obtain 10–20 miles of separation.
- Shut down the burners, but stay at 100-percent power.
- Keeping up your speed, make a broad sweeping turn, staying out of short-missile range but within range for your medium-range missiles (3).
- Keep firing Sparrows at your opponent until one strikes home.
- Close in for a one-on-one with the other target.

Figure 6-1. Cautiously Aggressive



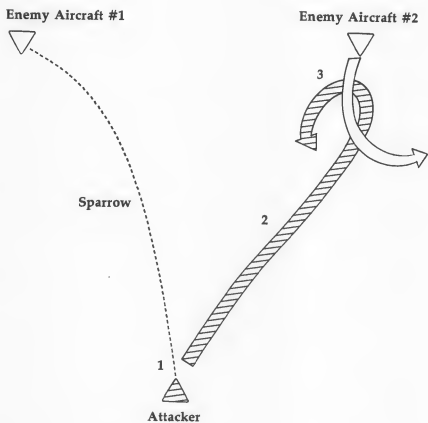
Totally Aggressive

To carry out a totally aggressive attack on two opponents may be exciting, but it's also very dangerous (or as dangerous as a simulation can get). History, however, is full of successful one-on-two accounts, so if the right opportunity presents itself, don't hesitate.

To aggressively attack two opponents, your bombs should be gone, and you should have plenty of fuel and at least two Sidewinders and two Sparrows.

- Fire off a Sparrow at one opponent to keep him busy for a minute or so (1).
- Head straight for enemy aircraft #2. You'll certainly have to dodge missiles here, so keep an eye out. An extra pair of hands and eyes here is very helpful (2).
- As you approach #2, cut power and try to out-turn your opponent for a gun shot (3).
- Keep an eye on the Sparrow that's chasing target #1. If the missile hits or runs out of fuel, fire a Sidewinder at #2.
- If the Sparrow you first shot missed and a Sidewinder shot at #2 also misses, break off the attack. Disengage and build up some airspeed; then repeat this procedure until one of the targets goes down.
- Move in for a one-on-one attack.

Figure 6-2. Totally Aggressive Attack





CHAPTER 7

General Tips, Hints, and Game Information

These hints, tips, and techniques for playing a better "game" can increase your score and make you a long-lived jet fighter pilot.

Some of the following playing tips and information were gathered from other F-15 Strike Eagle players and from conversations with Bill Stealey, President of MicroProse Software, and Sid Meier, author of F-15 Strike Eagle.

Accidental Ejection

In the Commodore 64 version of *F-15 Strike Eagle* only, it's possible to accidentally activate the ejection seat. This can occur when you're pulling on the stick and trying to change the radar scale at the same time. To avoid this, always let off the stick when entering keyboard commands on the Commodore 64 version.

Air Combat Mode Only

At the beginning of play, your F-15 is always configured in the air-to-ground mode. The F-15, however, was designed as an air superiority fighter. From time to time, you may want to simulate this mission, which you can do by using any of the seven missions except for 3 (Haiphong) and 6 (Iraq). Enemy air activity over these areas is slight.

The first thing to do on an air superiority mission is drop all bombs—they severely affect your aircraft's performance. Next, climb to 40,000 feet. This will give you plenty of maneuver altitude and put you out of SA-7 SAM range (which is

32,000 feet). Go looking for trouble by flying close to an air base. Missions 1 and 2 are particularly good for this due to the low SAM activity and multiple target possibilities.

Many F-15 pilots think they can become aces on their first mission, should a shooting war start. Becoming an ace *should* be your goal for an air superiority mission. Each time out, you should collect at least five kills. Once you accomplish this on a regular basis, try becoming a *double-ace* each time—that's ten kills. Since you carry only eight missiles, at least two kills must be made with your guns to become a double-ace in one mission.

As your dogfighting skills improve, work your way through the various skill levels to increase your difficulties.

Accumulating Points

If you're competing against another pilot, you'll want to accumulate as many points as possible. Points awarded for enemy kills increase with the difficulty level. Destroying a primary ground target results in the most points. Although primary targets can be destroyed with one bomb, it's possible to drop more than one on a target in a single bombing run and get point credit for all hits.

If you have a primary target lined up properly, and you have the time (uninterrupted by SAMs or enemy aircraft), you may be able to drop as many as four bomb loads before finishing your pass. If all four hit, you'll quadruple your point total.

Bail-Out

Don't be afraid to use the bail-out function when things get bleak—don't ride your airplane into the ground. At least try the bail-out key—after all, you have a 50/50 chance of being rescued and continuing your mission.

Bombing on Afterburners

Once you become proficient at bombing at 100-percent power, you should learn to bomb while on afterburners. Although this reduces your time over the target and lets you drop only one bomb load, it does have advantages. You're most vulnerable to both enemy missiles and aircraft while making a bomb run, so going in at maximum speed makes you harder to hit and harder to catch.

Clear the Map

Once you've successfully completed all the scenarios, you can go back and start with Mission 1 and not only hit the primary target, but clear the map of all targets. Remember that once all primary targets have been hit, you can't continue if you return to base. Save at least one primary target for the last strike.

Clearing the map takes a different plan from just completing the mission. Decide in advance what you want to do first: attack the closest targets or eliminate the SAM threat or air opposition. The ultimate in map clearing is to start with Mission 1 and clear each map in one sitting without losing your aircraft. Give yourself plenty of time—this can take eight or nine hours.

Code Chart

It's helpful, not to mention time-saving, to go through the simulation's manual and make a chart of the authorization codes. Keep this with your manual or beside your computer location for quick reference.

Completing Missions

The computer can't tell the difference between two bomb hits on one primary target and one bomb hit on two primary targets. If the mission you're flying has two primary targets, and you hit the first with two bomb loads and then return to base, the computer will give you credit for successfully completing that mission. You won't be able to go after the second primary target.

Copy the Maps

One thing that helps keep *F-15 Strike Eagle* interesting is the variety of ways to complete each mission. Plan your mission on a photocopy of the mission map and keep track of successful routes. This is what real fighter pilots do, and it's a good idea for you as well.

Navigation, fuel planning, and examination of enemy air defenses is just as much a part of an actual military operation as the time spent flying. It makes good sense for you to take these items into account before flying a mission.

Ease Off the Stick When Entering Keyboard Commands

In some versions of *F-15 Strike Eagle*, you can't use the joystick and the keyboard at the same time. When you want to activate a system that's controlled through the keyboard—afterburners, weapons selection, or the ejection seat—you must ease off the stick so the computer can recognize the command. Especially keep this in mind when you're trying to eject.

Finding the Ground

Sometimes when making a steep climb, you can lose track of up and down. If this occurs, the ground can always be located by activating the bomb sight. The line attached to the sight circle always points down.

Gliding

Running out of fuel is a problem with many of the missions. When it becomes obvious that you're not going to make it back to base before running out of fuel, start a gradual climb. The extra altitude will increase the distance you'll be able to glide.

When out of fuel and gliding, try to keep the nose at a level where you can maintain an airspeed of 240 knots. This yields the greatest glide distance.

Gun Fighting in Ace Mode

When attempting a gun kill in Ace mode, it can be very difficult to out-turn your opponent. In this case, instead of turning nose-to-tail, try turning nose-to-nose, slowing up, and then reversing your turn and allowing the enemy to pass in front of you. Be ready to shoot fast and be sure to lead your target.

Another tactic that may prove successful in Ace mode is to turn in front of your opponent and then perform a maneuver that makes him overshoot. This will put you on his tail in perfect firing position.

Learn to Fly Low

Flying low causes the flight of the aircraft to be a little inconsistent due to programmed "turbulence." Although this may be annoying since constant joystick adjustment is required, it's a skill well worth learning. Low-level flying lets you come in beneath the radar that guides some of the SAM missiles.

Limping Home

A damaged aircraft is often a fact of life in F-15. Nursing a wounded bird back to the nest can take some doing. If you decide you're going to make a dash back to the base for repairs, the first thing to do is drop any remaining bomb loads and the external fuel tank. Set your navigational cursor. Either hit the burners for a fast escape, or slow down, get low, and try to sneak back.

The aircraft tends to handle best at low speeds (around 240 knots) when damaged, but if you're over enemy territory, you'll be an easy target at that speed. Remember, the aircraft is much harder to handle at high speed when damaged.

Missile Damage

The missiles in this simulation, like real missiles, are equipped with proximity fuses. In other words, they don't have to actually hit your aircraft, but detonate when they're close. As you begin to operate at the higher skill levels, enemy missiles can detonate at increased distance from your aircraft and still cause damage. Take this into account when planning your defensive maneuvers.

Multiple Flights

In an actual strike against heavily protected targets such as those seen in the mission scenarios, an attack usually has several components.

You can simulate these using several flights from the base with different objectives. The first attack would be made by the "Wild Weasel" squadron whose job it is to take out the enemy surface-to-air missile launchers. Following that, strikes against air bases to reduce air resistance are conducted. Finally, the target objective is attacked.

You can do the same thing to complete some of the missions in the simulation. On the first flight, attack SAM locations; then return to base. Fly again to take out the primary target(s) or airfields. When making a bombing run at SAM sites or at the primary target, you probably won't need more than one or two racks of bombs. Drop the rest if they won't be used; otherwise, they'll slow you down.

Out of Fuel and Out of Altitude

When gliding toward base and it appears that you'll come up short, a minor program glitch can help you out. By repeatedly hitting the afterburner key, you can get small bursts of power that will increase your airspeed slightly.

Punch Out!

Surviving an ejection is dependent upon speed, altitude, distance from base, the proximity of enemy planes, control of the aircraft, and luck.

Save Those Flares

When playing at the higher skill levels, it's a good idea to try to jink incoming air-to-air missiles without using flares. Your flares will better serve you when you're trying to avoid the much tougher heat-seeking SAMs.

Simulated Landings

Although landing isn't a part of *F-15 Strike Eagle* as it is with other flight simulators, you can duplicate it by being at less than 500 feet and falling when you fly over the blue triangle that represents your home base. The ultimate is to go into the triangle when your low-altitude warning has sounded.

Skill Levels

Arcade. This level should only be used to familiarize yourself or a new user with the plane's basic operation. The aircraft won't bank in a turn in this mode. One gun hit destroys the opponent.

Rookie. (Easy) Beginners should start here. The plane operates correctly and two gun hits are required to down an enemy aircraft.

Pilot. (Moderate) Things begin to get more difficult here. The opposing pilots are much better, but will occasionally attempt to run after a long, turning fight, giving you a good missile shot or guns opportunity. At least three gun hits are required to score a kill. Bombing and returning to base must be more precise. SAMs are more accurate.

Ace. (Tough) SAMs are very accurate. Enemy pilots are very good and won't disengage. Keep an eye on your energy level and altitude as enemy pilots will turn you right into the ground if you're not careful. At least four gun hits are required

to down an enemy, and often more. Bombing must be precise, and returning to base, you must be well under 3000 feet. Unless your dogfighting skills are very good, stay away from turning fights, and use missile attacks only.

Spin Recovery

In both reality and the simulation, the F-15 isn't an easy aircraft to spin. It's possible, however, to find yourself in a disorienting spin due to damage to your aircraft, poor flying, or both. If this happens, extend your speedbrake to slow, or stop the aircraft's rotation. Locate the horizon, level your wings, and pull out of your dive.

Two-Player Team

Although the *F-15 Strike Eagle* manual makes only slight mention of the two-player system, I feel it's very important. The real F-15E is a two-man aircraft, as is the Navy's F-14 Tomcat. The benefit isn't only in the extra pair of hands for operating complex weapons systems, it's also in the extra pair of eyes. These same benefits translate well to the simulation.

In a two-player simulation, one person operates the joystick, functioning as pilot, and the other operates the keyboard controls, functioning as weapons officer, or GIB (Guy In Back), as they're referred to. The pilot doesn't have to look away from the screen to push buttons or check radar.

In this system, duties should be divided as they're outlined below.

Pilot's responsibilities:

- Fly the airplane.
- Choose and release weapons.
- Give orders (someone must have the final say).

Weapons officer's responsibilities:

- Watch the radar screen. Things happen very quickly in battle and the radar screen gives you the best clues to what's coming at you.
- Watch the radar and infrared-scanning indicator lights. The warning lights tell you what type of countermeasures to use. When two SAMs are in the air, the weapons officer must determine which is the infrared-homing SAM and which is

radar-guided. This can only be done by noticing which warning light comes on first.

- Deploy countermeasures and tell the pilot to break away and in what direction.
- Place the NAV indicator in the correct position.
- Drop the external fuel tanks when the fuel level reaches 13,500 pounds. Continuing to fly with the drop tanks attached reduces your fuel efficiency and performance.
- Respond to pilot commands to operate the following systems: speedbrake, throttle increase or decrease, afterburners, arming weapons, bail out, rear-view control, reminding the pilot of altitude during combat.

It's important to give the second player as much to do as possible to keep him or her from getting bored and becoming a spectator instead of a participant.

Use Your Afterburners

Afterburners can be useful in several areas. When you're making a low-level bombing run, the extra-speed afterburners reduce the time you're in SAM range and make it harder for them to hit you.

When involved in a tight turning fight, you'll rapidly bleed energy and airspeed. If you start to get stall warnings in a tight turn, use your afterburners to increase your airspeed to 500 knots; then return to 100-percent power.

This may be necessary several times during a dogfight to keep your airspeed up and to prevent stalls.

CHAPTER 8

Mission Maps and Briefings

Each mission in *F-15* is based on a real situation. Learn more about these situations and how to be successful with strategic and tactical tips.

In *F-15 Strike Eagle*, you have a choice of seven combat missions—all based on actual incidents. Completing these missions can be difficult at times and seemingly impossible at others, which is why I'm offering these tips and techniques. Hopefully, they'll help you end each mission successfully. Keep in mind, however, that there are many other ways to accomplish the same thing. My advice is not the only, or necessarily the best, plan of attack.

Mission 1: Libya, 1981

Scenario: On the morning of 19 August 1981, two F-14 Tomcats of U.S. Navy Squadron VF-41 (Black Aces) were patrolling 60 miles south of the carrier *Nimitz* in the Gulf of Sidra near Libya.

Two Libyan SU-22 Fitters were detected and the F-14s were dispatched to intercept. As the F-14s closed on the Libyans, one of the SU-22s fired a missile (probably an AA-2 Atoll). The F-14s broke away rapidly to avoid the missile and engaged the Fitters.

In the short battle that followed, Squadron Leader Commander Henry "Hank" Kleeman; Lt. David Venlet, Kleeman's RIO (Radar Intercept Officer); Kleeman's wingman, pilot Lt. Lawrence "Music" Muczynski; and Muczynski's RIO, Lt. (j.g.) James "Amos" Anderson each shot down an SU-22 with an AIM-9L Sidewinder missile shot.

Mission 1 is based on this incident and more. You get to do what the F-14 pilots couldn't: carry the attack to bases in Libya. Since this is the first mission, it's also the easiest. You won't encounter SAMs during the flight.

Tactics: To complete this mission, quickly do away with the enemy plane you find in front of you as the simulation begins. A Sidewinder or several quick gun bursts should do the trick.

Next, place the NAV cursor over the primary target, descend to 3000 feet, and fly toward the target. Use medium-range missiles to keep other enemy aircraft busy while you make your bomb run.

Drop as many bombs as possible on the target and pull up. With the main target destroyed, you can continue to attack ground targets, or drop the rest of your bomb load and head back to the coast where you can engage enemy planes until you run out of ammunition or fuel.

When your fuel falls to 5000 pounds, it's time to head for home.

Mission 2: Yom Kippur War, 1973

Scenario: In October 1973, hostilities between Egypt and Israel again reached the boiling point. On 6 October 1973, Egyptian tanks crossed the Suez Canal. At the same time, 100 Syrian tanks moved into the Golan Heights area of Israel. During the Yom Kippur War, many large-scale air battles were fought between Israeli F-4 Phantoms and Syrian and Egyptian MiG-21s and MiG-17s. The Israeli Air Force (IAF) estimated a kill ratio of about 40 to 1. The Israeli F-4s downed 164 Egyptian aircraft in air combat while losing four. On the Syrian front, meanwhile, three Israeli jets were lost while destroying 95 Syrian aircraft.

Tactics: Take advantage of the limited capabilities of the Egyptian SA-7 SAMs. Flying above 32,000 feet puts you out of SAM range; using afterburners lets you outrun any air resistance on the way in.

Go toward the primary target at high altitude and high speed, pass over the target, and begin your descent. Turn back toward the target, approach at 2000–3000 feet, drop as many bombs as possible in your single run, and continue on toward the base at high speed and altitude.

Mission 3: Haiphong, North Vietnam, 1972

Scenario: Following a North Vietnamese incursion across the Demilitarized Zone (DMZ) in late March, bombing of North Vietnamese targets was again authorized.

This mission is based on the missions flown by F-4 and A-6 pilots during the bombing campaign code named *Linebacker I*.

Tactics: Take advantage of the poor, low-level performance of enemy radar used to guide the SA-2 and SA-3 SAMs.

Immediately after starting the simulation, descend to below 1500 feet and stay there. Enemy MiGs weren't active during the first stages of Linebacker I and shouldn't be a problem.

Place the NAV cursor over the first target and make your bomb run. If you don't have another person helping as weapons officer, it's best to pass over the second target and then regroup.

Place the NAV cursor and turn around making your second bomb run so you'll be heading out to sea once it's completed.

Mission 4: Syria, 1984

Scenario: When the Syrians started moving modern Soviet-built SA-9 SAMs near the border, the Israelis decided to act. The locations of the emplacements were determined using RPVs (Remotely Piloted Vehicles). These small unpiloted drones carried cameras and accurately located the targets. F-15s and F-16s then flew a number of successful bombing missions. The Syrians used heavy smoke in an attempt to hide the locations of the SAMs, but the Israeli preflight homework paid off.

Tactics: This is the first mission with all the threats working against you. The Syrians have radar and infrared-homing SAMs, MiG-21s, and MiG-23s. Your primary target is a long way from home; the distance can be a very real threat in itself.

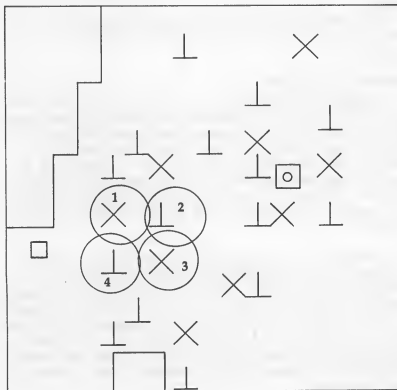
This mission is best handled in two phases. First, take out the two closest SAM and airport locations. This will make it easier to get in and out during the second phase. After taking out the first four targets in Phase 1, return to base to rearm, refuel, and repair.

You can fly more missions to soften up the path to the primary target, but the mission can be completed on the second flight by flying in fast toward the target with a light load of two or three bomb loads. If you're really confident, take only one. (The fewer the better, because fuel conservation is important.)

Afterburners can be used for a while, but not for the whole trip. Go straight in, make your bomb run, and head straight home. Heading home can be done at high altitude if you've cleared out most of the radar-guided SAMs. If you do run out of fuel, don't bail out immediately since the plane will glide a considerable distance with no bomb load.

Figure 8-1. Mission 4

The numbers indicate the first-phase targets in the order of attack. Target #2 is an infrared-homing SAM site; target #4 is a radar-homing SAM site.



Mission 5: Hanoi, North Vietnam, 1972

Scenario: On 10 May 1972, United States aircraft first used laser-guided bombs in an attack on North Vietnam. These highly accurate devices could be guided to within several feet of a target, which was illuminated by a laser beam from an aircraft off the target.

The *F-15 Strike Eagle* manual lists both primary targets as oil depots. One of the main targets for the 10 May strike, however, was the Paul Doumer Bridge, a major link in rail and road traffic in and out of Hanoi. A small strike force scored a decisive victory by landing 12 direct hits on the bridge with laser-guided bombs.

Tactics: In this simulation, unlike the real event, SAMs won't be a factor. Since you don't have to worry about SAMs, the best approach is to take the targets one at a time. Go for the closest target first—climb to 10,000 feet, set the NAV cursor, and hit the afterburners.

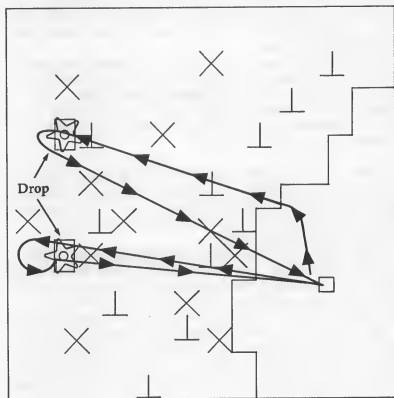
Drop all but two bomb loads to increase your speed and range. Fire Sparrow missiles at any enemy planes that come up against you, and keep heading straight for the target. You should be able to outrun the enemy planes if necessary.

Fly directly over and past the target for about ten miles; then cut off the afterburners, perform a Split-S maneuver back toward the target, and make your bomb run, heading back toward base. Note that if both your bombs land on target, the mission counts as completed and you won't be able to go back out after the second target.

To attack the second target, similar tactics are used. Follow a path north along the coast at 85-percent power, carrying two bombs. When you're almost even with the target, cut in and head toward it. Keep your power level at 85 percent as long as possible, but hit the afterburners once you're attacked. Go straight in for your bomb run, drop your bombs, light the burners, perform a vertical half-loop, and head straight for home. You should be able to outrun most of the enemy air traffic. Climb to 20,000 feet just in case you run out of fuel and need some altitude to coast back to the carrier.

Figure 8-2. Mission 5

The flight plan for Mission 5 shows how you can successfully strike at both primary targets.

**Mission 6: Iraq, 1981**

Scenario: Etzion Air Base in the Sinai Desert is normally a very busy place. On 7 June 1981, it was even busier than usual. Early that morning, a group of Israeli F-15s and F-16s began a highly controversial mission. The Iraqi nuclear reactor south of Baghdad was about to become operational and the Israelis believed it was capable of producing weapon-grade fissionable material. In anticipation of its completion, the Israeli Air Force had been practicing an attack on the reactor for over a year. The time had come for the plan to go into action.

The attack force flew around Jordan, through Saudi Arabia, and into Iraq low and fast. When questioned by Jordanian

air controllers, they convinced them that they were Saudis on a training flight. The attack was carried out so quickly that neither SAMs nor Iraqi aircraft had time to react. The one-ton bombs carried by the F-16s were extremely accurate. The reactor and surrounding buildings were destroyed.

Tactics: When flying the simulation, you won't have the benefit of reality—you'll experience heavy SAM and occasional MiG opposition.

This mission can be completed in one flight with a little luck and a lot of jinking to avoid SAMs. Again, fuel conservation is very important, so immediately drop all but two bomb loads and shoot off half your missiles.

Descend to below 1500 feet and head straight toward the target. You'll receive a lot of attention from the SAM operators, so be prepared to respond with jinks and brief afterburner spurts to avoid the infrared-homing missiles.

Make your bomb run; then perform a vertical half-loop and hit the afterburners. Set the NAV cursor for home base and climb to 35,000 feet to avoid the infrared-homing SAMs. Continue on afterburners until you're out of range of SAMs; then keep your speed up over 1500 knots by losing altitude as you approach the base.

Be sure to lose altitude fast enough because fuel will be critical at this point. Also be alert for enemy aircraft. There won't be many, but they can show up at the worst time.

Mission 7: The Persian Gulf

Scenario: Several times a year, the U.S. Navy conducts maneuvers in the Persian Gulf to show our determination to keep this vital shipping avenue open. This mission pits your F-15—flying on Combat Air Patrol—against attacking Iranian jets and missiles.

Tactics. Since this is the final mission, you probably expect it to be the toughest. You won't be disappointed.

There's no easy or best way to complete this mission. All the possible threats are waiting for you with expert-level operation. Skill and patience will be necessary to destroy all three primary targets and return safely to base. You'll probably take a hit or two in the process.

Once hit, you should immediately determine the handling capabilities of the aircraft and return to base if necessary.

This mission can be broken down into two, or possibly three, steps.

Part 1. The first flight is the optional one and consists of a Wild Weasel-style raid on one or two SAM locations on the western bank of the gulf. Destroying these targets will make the flight up to the northernmost target much safer, but will expose you to heavy missile fire during your bomb run and increase your exposure to Iranian aircraft also in the area. You'll have to make this decision: Do you want to complete the mission in two highly dangerous trips or three only slightly less dangerous steps?

- To fly this optional mission, first decide how many targets you intend to bomb: one or two. The southernmost SAM site on the western bank shouldn't pose a threat, so concentrate on the other two.
- If you decide to attack only the middle SAM site, you can do this fairly safely by approaching low on afterburners, bombing, and then heading back to the ship on afterburners. If you intend to destroy both targets, you'll need to conserve fuel and use the afterburners only sparingly to avoid SAMs.

I recommend attacking the northernmost target first since it's the most difficult. It's very frustrating to fight your way in and out, destroying the first two targets, only to fail in your attempt on the third. By attacking in this order, you can rack up several bomb hits on each of the lower primary targets and increase your point total. If you get more than one hit on these targets on the first part of the mission and return to base, the mission will be over.

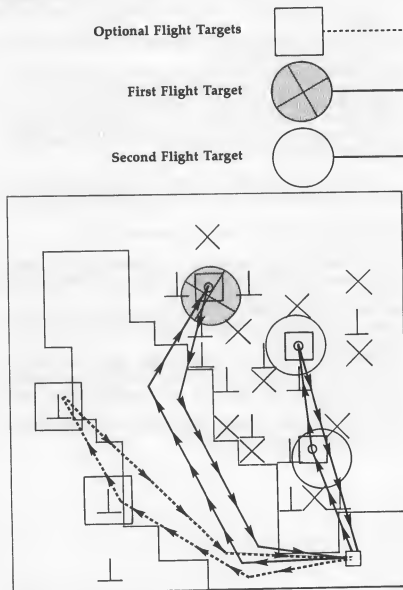
- To attack the northernmost target, fly up the gulf over water at medium altitude (at least 35,000 feet).
- Proceed with only two bomb loads and at 85-percent power once you reach altitude. Fuel will be critical on this leg of the mission.
- When you're slightly south of the target, cut in toward land, between the two SAM sites.
- Use a steep descent to keep your speed over 1000 knots.
- Make your bomb run (dropping both bombs), and return by the same path at high altitude on 85-percent power.
- Remember to drop the external tanks as soon as you reach 13,500 pounds of fuel; the extra drag and added weight reduce your speed and fuel efficiency.

Part II. Once you've successfully completed the first part of your mission, the second part should be no problem.

- Set the NAV cursor on the first target and hit the afterburners.
- Fly at about 3000 feet straight toward the target, cut back to 100-percent power once the target appears on medium-range radar, and make your bomb run.
- If your first bomb misses and you can't accurately drop the second, don't go back; head toward the second target with the afterburners lit.
- Repeat the process at the second target. Make your bomb run going in so that if you miss, you can return to the carrier. If you missed the first target, you can try again on your way back to base.
- A total of four bomb loads is recommended for this leg of the mission: two for each target.

Figure 8-3. Mission 7

Mission 7 requires at least two, and possibly three, strikes against the various targets.



PART IV. SOFTWARE ORIENTATION FOR *F-15 STRIKE EAGLE II*

The original version of *F-15 Strike Eagle* was much like the original version of the F-15 aircraft: hard hitting and exciting, but basic. As technology changed, the Air Force conducted a Multistage Improvement Program (MSIP) to bring the F-15 up to state of the art. Recently, MicroProse conducted its own MSIP to bring the *F-15 Strike Eagle* simulation up to the state of the art. Graphics, game play, and enemy intelligence have all been reworked to incorporate all the advances made since the original program was released in 1985.

Although the game play is very similar, as is its overall "feel," this simulation does operate differently and requires different tactics and strategies to be effective. This section will cover these tactics, information on game scoring, and detailed analysis of enemy capabilities and strategies for success in all the theaters of operations.

CHAPTER 9

Winning Tactics for *F-15 Strike Eagle II*

From takeoff to the mission and then back to a safe landing, special tactics and techniques are explained to improve your chances of success.

Flying the Aircraft

Takeoff

If you're flying in Rookie mode, you won't have to worry about taking off—you'll already be flying when the screen comes up. Other modes require you to take off manually. The process is very simple: Just hit the Afterburner key and let the plane roll until you're above stall speed; then ease back on the stick. There are two things you should also keep in mind. First, if you're too light on the stick, you may only lift the nose up. It may look like you're flying, but the main gears are still firmly on the ground. When the altitude indicator in the right side of the HUD begins to move, you're airborne. Second, don't wait too long to lift off. If you run off the end of the runway at high speed, both you and your aircraft will be destroyed—hardly a good way to start and finish a mission.

Landing (Runway)

The most important—and difficult—part of learning to land is learning how to get properly lined up with the runway. Imagine that the runway isn't a short concrete strip but, instead, a straight highway that extends for miles to the north and south. (Remember that all runways and carriers in *F-19* are lined up pointing north-south.) This is a long and wide highway, but you can only land on the portion near the base.

If this were the case, getting lined up would be easy: You could just fly over to the highway, turn, and follow it all the

way back to the base. You would be perfectly lined up. Learning how to use a couple of the instruments you have on board will allow you to do this.

Getting Lined Up

The instruments you really need to pay attention to in order to get properly lined up are the *heading indicator* along the top of the HUD and the *NAV cursor* (the small triangle-shaped pointer that moves along the heading indicator to guide you toward different locations).

To see how to use these instruments to line up for a landing, you can set up the game up as follows and try the procedure.

Mission: Libya

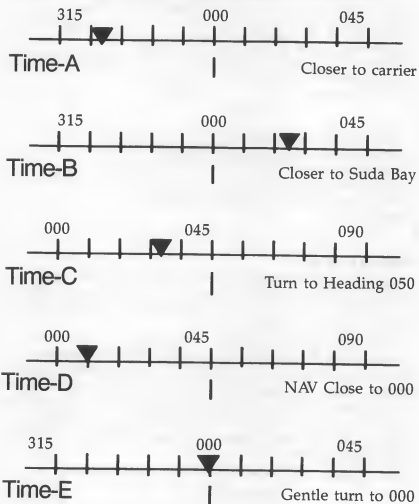
Targets: Pick a mission with targets in the southeastern area—around Benghazi and Benina.

Mode: Pilot

Training: Once airborne, hit Alt-T to switch to Training mode (now enemy weapons won't damage your aircraft). Fly to the targets and take them out. You can do this on afterburners if you like—you can hit Alt-R to refill the gas tank and reload weapons.

- Now that you're ready to head for home, you should be heading north. Make your heading 000. Once you go "feet wet" over the water, your heading indicator should look like Time A or Time B in Figure 9-1, depending on your position.
- If you're west of Benghazi and closer to the aircraft carrier, the NAV cursor will point there—the NAV cursor will point to the closest friendly base. Either way, you're going to continue on to Suda Bay and land on the runway.
- Once you're over the water, turn right to a heading of 050.
- Climb to 4000 feet.
- When you get closer to Suda Bay than the carrier, your HUD should look something like Time C in Figure 9-1. The NAV cursor is pointing toward Suda Bay, which is now to your northwest (to your left).
- Continue on this heading and note how the NAV cursor moves to the left, toward the 000 indicator.

Figure 9-1. Top of the HUD When Lining Up for a Landing



- When the NAV cursor is one major division away from 000 (Time D in Figure 9-1), start a gentle turn to your left, toward the base. Your goal is to pull out of the turn with your wings level, just as the NAV cursor and the 000 indicator reach the center of the HUD (Time E).
- Now you're heading straight toward the base on a heading of 000 and lined up for landing. If you've maintained your alti-

tude of 4000 feet, you should get a good look at the runway and be able to make any small adjustments necessary.

- Now back off on the throttle until your airspeed falls below 300 and start your descent to the runway.
- As soon as the wheels touch down, cut the engine power to minimum and hit the brakes button once.

NOTE

There's some leeway programmed into the system. If you come up a little short (less than a kilometer), you should still be OK. Also, if you run a little off the end of the runway, you should be OK if your speed is less than 40 knots or so.

Landing (Carrier)

Carrier landings in this simulation really aren't that much harder than runway landings. In fact, due to the nature of carrier landings, you can hit the flight deck much harder than when landing on a runway.

Your line-up and approach should be the same as for a runway landing, but you might want to make a steeper approach so you can get a good look at the carrier deck and the arrestor cables. The landing portion of the carrier deck is canted 15 degrees, so to use that part of the deck for landing, you need to land on a heading of 165 degrees. It really doesn't matter, however; landing straight-in on a 180-degree heading will work just fine.

WARNING

The carrier deck is 125 feet above the water, so keep an eye on your altitude as you approach.

Unlike runways, which work fine in either direction, you can only catch the cables on a carrier from the north (headed south on a 180-degree heading). There are no cables to catch you on the front of the ship. Landing on a 000 heading is possible, but there are no cables to stop you. However, if you come in very close to stall speed with the brake on, you should be able to stop on your own. You may then have to taxi around to get enough deck in front of you to take off again.

Weapons Deployment

Cannon

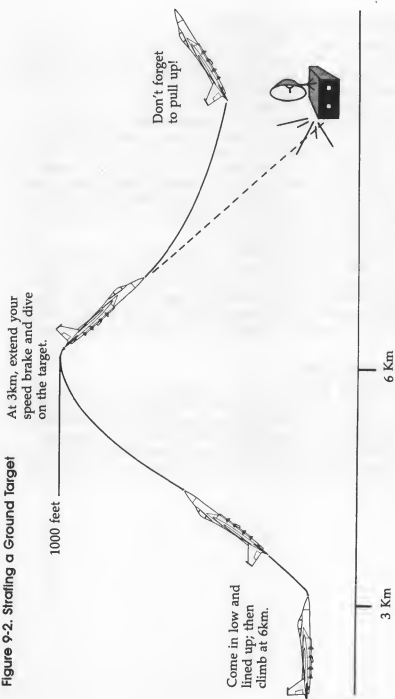
Many beginners often ignore the cannon in the air-to-ground role, but to get those really high scores, you need to pick up extra ground targets when you run out of Mavericks. The cannon lets you do this.

The real key to learning to strafe ground targets is to get a set procedure and use it over and over again until it comes naturally. The following is a good example:

- Line up the target early. Once you start to dive on the target, it's too late to make major course changes. Therefore, take the time to make sure you're perfectly lined up as you approach the target.
- Approach the target at low altitude until the range to the target is 6km. This way, you can avoid detection until the last possible moment.
- At 6km, pull up hard, being careful to maintain a straight course. Level out at 1000 feet or so. The exact altitude isn't important—you just want to make sure you have enough room to dive on the target. As your skill improves, you'll find that you require less altitude and can start your attack from lower.
- Your gun is most effective when the range is less than 3km. Therefore, at 3km, extend your speed brake and start to dive on the target. Put the aiming circle either directly on the target or just a little in front of it. Fire a short burst and watch where the shells land. Make minor adjustments and continue to fire short bursts.

- Pull up as soon as you hit the target or if you get below 400 feet. Unless you have the landing gear down or are diving very steeply, the aircraft will automatically pull up at 300 feet. As you gain experience, you'll be able to judge when to pull up by the size of the target, which will get larger as you approach the ground. *Don't wait too long before you pull up.* Most targets you would strafe are only going to give you a few points. Don't get so involved that you fly into the ground while trying to destroy a 30-point target.

Figure 9-2. Straling a Ground Target



Gun in Air-to-Air Combat

In a tight turning “knife fight in a phone booth,” your 20mm cannon will be indispensable. The manual does a good job of explaining the historical gunsight on page 47. Take a minute to review this section if it isn’t familiar to you.

The main thing to master is *anticipation firing*. Use the track cam and your view of the bogey to get a good idea of the direction he’s heading; then maneuver toward him and watch your gunsight start to move. After that, it’s just a matter of watching both the gunsight and the bogey and maneuvering so that their paths cross. When the gunsight starts to move toward the target, you need to anticipate and fire just before they cross so your shells and the bogey will both arrive at the same point at the same instant.

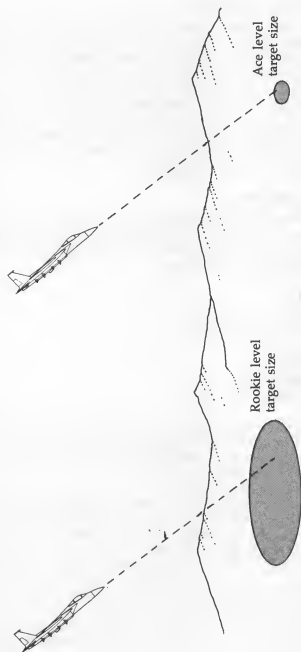
Also be aware that due to the system programming, it can handle only one input at a time. If you’re moving the joystick to maneuver the plane, that will normally override the command to shoot if you squeeze the trigger. To overcome this, you need to ease off the joystick when you’re about to shoot so the fire command will be the only input at that second.

Gun Accuracy

The accuracy required to destroy a target increases as you move up in difficulty levels. In other words, it’s much easier to successfully strafe a target or gun down an enemy aircraft when playing in Rookie mode than it is in Veteran or Ace mode.

In Rookie mode, you only have to get close to the target and it will be destroyed. At the Ace level, you really have to hit the bull’s-eye.

Figure 9-3. Changes in Gun Accuracy



As you increase the difficulty level, the size of a strafing target decreases, forcing you to be more accurate.

Targets for Strafing

Your cannon is effective against most ground targets; only very hard targets such as runways can't be destroyed with it. Depots are especially good strafing targets since they're often located away from other targets and they don't shoot back. Oil tanks also go up in a hurry under a gun attack.

Although it may be dangerous, SAM sites can make good gun targets. If you approach from the correct angle, you can destroy a missile launcher or two as well as the radar in one pass. Once over the site, you're pretty safe since the SAM launchers can't shoot straight up.

Air-to-Air Missiles

The air-to-air missiles used in this simulation have great range and are very accurate. In fact, the ranges and accuracy are probably better than you realize. The program has these ranges fixed at the following:

AMRAAM

Max range: 36km

Max effective range: 16km

Sidewinder

Max range: 18km

Max effective range: 9km

with the *max range* being the farthest away you can be and still get a hit (where the target box changes to an oval), and the *max effective range* being the high-probability kill zone (where the oval changes color).

These ranges actually vary a great deal, depending on your speed, the target's speed, and your position relative to the target. In other words, if you're on afterburners and the target is coming at you head-on, your speed and the target's speed are both effectively added to the speed of the missile, allowing it to be fired at a target much farther away than normal. In this situation, you could be reasonably sure of a hit by firing an AMRAAM when the target is still 50km away—long before the target box turns to an oval. In fact, it's a good idea to shoot early at head-on targets. If you wait until the oval changes color, the target may be by you before the missile has a chance to track it and lock on.

Conversely, if the target is flying away from you at high speed, and you're flying very slow, an AMRAAM fired from 30km might not reach the target. However, missiles fired from the rear are harder to jink.

Shots fired at the side of a target, especially Sidewinders, have a lower probability of hitting. In a close-in fight, it's better to wait until you're behind the target to fire. Shooting at a target flying across your path is often a waste of a good missile, especially at close range.

Great care should be taken when firing air-to-air missiles near a friendly base. The skies are often crowded with friendly aircraft as well as the bad guys. Unfortunately, your missile can't tell the difference. If a friendly aircraft should happen to wander in front of an enemy, the missile would lock onto him and probably land you in hot water.

Air-to-Ground Missiles

Using the Maverick missile on ground targets really couldn't be simpler. In fact, it's probably the one area of *F-15 II* that's actually easier and less complex than the original version. There's little aiming required: just fire it off in the general direction. However, waiting for the range to close is very important. If you fire before the oval changes color, your chances of scoring an effective hit go down. Therefore, if at all possible, wait for the oval to change colors before letting your Maverick shot fly, especially when attacking important or dangerous targets.

There are times when, for whatever reason, you must fire early—in fact, the earlier the better. Firing at high speed does give your Maverick a bit of range extension, but not as much as with the air missiles. Firing at speeds over 800 knots will give you about five extra kilometers, increasing the max range from 30 to 35 clicks.

Use All Your Weapons

There's no use in carrying a weapon all the way into enemy territory and then bringing it back home again. Use all your weapons every time out. If fuel isn't a problem, you can go looking for more air or ground targets. If it looks like fuel may be a problem, make sure you use all your ground attack weapons—at least while in the target area. It might be a good idea

to keep at least one air-to-air missile with you until you're over safer ground, but try to find a target for that one on your way home as well.

Multiple Bogeys

No two ways about it: You'll almost always find yourself up against more than one enemy aircraft. The trick is to deal with as many as possible at long range. Try to even the odds before getting into a close-in dogfight.

Since you can only track one target at a time, its best to start shooting at close-to-max range if more than one target is in front of you. Let an AMRAAM fly early; then switch to Sidewinders. By the time the AMRAAM hits its target, you'll probably be in Sidewinder range.

You can attack more than one air target at a time if they're off in different directions. If you have one target to your left and one to your right, you can fire at one and then swing to face the other one. The HUD should then be targeting it. Then, you can launch a second missile. This can only be done if the targets are far enough apart so they both don't appear on the HUD at the same time.

Whenever you're engaged in a multiple bogey fight, it's a good idea to keep your speed and energy level up. Use high-speed slashing attacks, and change targets often. Concentrating too much on one target will allow others to swing around and get on your tail. Always try to keep them off balance.

Also remember to keep an eye out for SAMs in this situation. When things start to get crowded on your radar display, it's easy to miss an incoming SAM.

Defensive Tactics

Turning and dogfighting with enemy aircraft has already been covered fairly well. Do what you must to survive. The other major threat, probably more dangerous than enemy aircraft, is *surface-to-air missile* (SAM) fire. SAMs will be coming at you almost continuously during your time behind enemy lines. Learning how to effectively deal with them will spell the difference between success and failure.

Know the Missile Type

When the tone sounds indicating a missile launch, it's imperative that you look up to the top of the HUD for information on the type of missile. The capabilities of the various enemy missile systems vary greatly. Some are extremely dangerous and some are easily fooled. Knowing which kind is coming at you will determine your response.

You'll only have a second or two to look up and see the missile type displayed. Once it's gone, you won't know for sure what kind of missile is headed your way. You can, however, get some idea of the missile's capabilities by dropping a bundle of chaff while it's still a long way off. If the tracking indicator light goes off when you drop the chaff, you'll know the missile isn't Doppler guided and can be fooled easily. If it doesn't go out, you'll know the missile has a sophisticated Doppler guidance system that chaff alone won't fool.

Avoiding Radar Guided SAMs and AAMs

Radar guided SAMs and air-to-air missiles are the enemy's most lethal weapons. Infrared (or heat) guided missiles can be trouble but are generally easy to fool by a flare.

Radar-guided missiles fall into two categories: *beam-riders* and *semiactive* Doppler systems.

Beam-rider missiles. These are generally older and are easily fooled. They follow the radar beam from a ground or air source to the target. Since the source is a long way off, it's easier to decoy or jam it. Chaff will cause beam-rider missiles to lose "lock-on." Once the lock is lost, they continue flying in a straight course. Therefore, after you dispense a bundle of chaff, you must also change course if the missile is coming straight at you from the rear or from the front. This explains why occasionally you may decoy a missile, but it hits you anyway.

Detection by beam-rider type systems can be delayed by flying low and directly toward the source of the radar signal. This reduces the system's effectiveness.

Semiactive Doppler missiles. These are much harder to shake. They use a Doppler detection system that's extremely good at detecting targets moving toward or away from the source. They also have a small radar transmitter built into the

nose of the missile. As the missile gets close to you, it can burn through jamming and see through chaff. Chaff alone won't fool them.

To defeat this type of system, you must use the strength of the Doppler system against it. Since it's very good at detecting targets moving either toward or away from it, you must turn so the missile is directly off to one side. You need to maneuver so that your path is at a right angle to the path of the missile. This will keep you from moving toward or away from it as much as possible. Once you get turned to the correct perpendicular course, the radar tracking light will go out and the missile on the radar screen will turn dark, indicating that the missile has lost its radar lock. If you continue on this course, the missile will eventually pass harmlessly behind you.

As you increase the difficulty levels, this safe area gets smaller and smaller. At Veteran and Ace levels, you may have to constantly maneuver to keep perfectly perpendicular to the missile to keep it from locking on to you. When flying at the higher levels of difficulty, it's a good idea to use the shortest range on the radar as the missile approaches you. It isn't uncommon for you to move out of the safe zone just as the missile is passing behind you, which may give the missile a chance to acquire you at the last second and score a hit. If you're watching on the radar screen, you'll see the missile start to flash again; you should then be able to maneuver back into the safe area.

There are only three SAM missiles that have this system. The ones you should worry about are:

SA-10

SA-12

SA-N-6 (fired from missile boats)

There's one air-to-air missile of this variety: the AA-10, and it can be very tough. Front-line fighters may be found with them, and they almost always show up on enemy II-76 Mainstay AWACs aircraft.

WARNING

You must maneuver to defeat these missile types. Simply deploying bundles of chaff won't work.

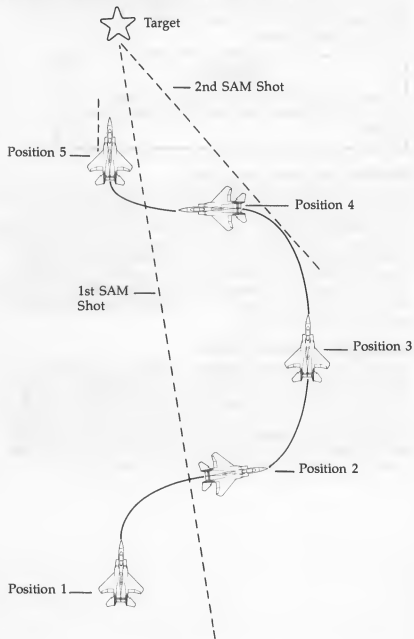
Optimize the Use of Your Chaff

You don't have an unlimited amount of chaff, so use it wisely. Once you get over enemy territory, it's likely that you may have missiles coming at you from a number of sources, several at a time. With proper timing and clever maneuvering, it's frequently possible to fool two or more missiles with a single bundle of chaff. This normally involves waiting until both missiles are close to you before deploying the bundle. Having an extra bundle or two when trying to limp home damaged may save you and your aircraft.

Attacking High-Threat Targets

Anytime you're trying to destroy a SAM radar, missile, or anything located next to a SAM site, you're heading into a *high-threat* area. If the SAM has Doppler-guided missiles, the threat is higher still. In order to get close enough to launch a Maverick, you'll have to head toward the target; however, heading *directly* toward it may not be the best path. An indirect route known as an *offset approach* might be a safer choice.

Figure 9-4. Offset Attack on a High-Threat Target



Position 1. To use this approach you start off heading directly toward the SAM site.

Position 2. When the site launches a missile at you, wait a second or two so you can get closer to the target; then turn away on a perpendicular course to fool the missile.

Position 3. Once the missile is past, don't head directly back toward the target; instead, head off to the side.

Position 4. When the site launches another missile at you, you can now turn back toward the site to get perpendicular and fool the missile.

Position 5. Now when clear again, you may be close enough to head directly into the target and attack it before it can get another shot off.

Mission Planning

Knowing what you're going to do and how you're going to do it before the wheels ever leave the tarmac is vital to mission success. Although very few plans stand up to the stress of combat, it's much better to have a plan and change it than to have no plan at all.

Mission Selection

Even at the same difficulty level, some missions are much easier than others. The type of enemy SAM sites and the location of the targets can be just as important as the level of difficulty you've chosen. If it's your first time at a high-difficulty level, or you're going for one of the top medals, be selective about the mission you choose.

Missions where the primary and secondary targets are very far apart and/or deep behind the lines are very tough. For an easier time at Ace level, keep restarting the game until you get a mission where both targets are close to each other and are fairly close to your base.

Ingress

Getting to the target can be the easiest part of the mission, or the toughest, depending upon a number of concerns. Unfortunately, you have little control over most of these concerns, but there are a few things you can do to improve your odds.

First, the enemy is expecting you to come from the direction of your base and will keep a good lookout. If you take off and approach the target from a different angle, chances are you won't be spotted until you're much closer to the target area.

Second, go in low. The lower you fly, the harder it will be to spot you on radar—the lower the better.

Take out any troublesome SAM sites on the way in. That way, you won't have to deal with them on the way out. This is especially important if you have to fly between two SAM sites to get to the target area.

You'll be in good shape while you're flying between them, since you'll be at right angles to both of them and neither will be able to get a lock on you. As you go beyond them, however, you'll run into trouble. As you're about to attack the target, both sites will be launching missiles at your rear quarter. It may be impossible to get perpendicular to both of them, and if they're both Doppler systems, you'll be in trouble. For this reason, it's best to take out one of the sites on your way in. This may mean facing a couple of missiles while you're attacking the site, but they're much easier to deal with head-on.

Egress

After you've taken care of the primary and secondary targets, it's time to look for a way home. A straight line may not be the best course. If possible, take a course that puts most or all of the remaining SAM sites off to one side. It will be easier to avoid the SAMs if they're all coming from the same direction.

This is also the time to pick out likely targets for any remaining Mavericks you may have on board. Those missile boats you avoided on the way in can make great targets on your way home. If things are quiet, you may want to pick a couple of targets for strafing. Extra ground targets really add to your point total.

Another important thing to consider when heading home is which airbase to head for. Your navigation system will position the cursor on the HUD to guide you to the nearest base once both missions are complete. However, this may not be the best place to land. You'll generally attract a lot of attention while completing your missions, so it may be best to land a little farther away from the bad guys. Trying to line up a landing is hard enough without having to dodge SAMs and enemy aircraft at the same time.

CHAPTER 10

Scoring, Promotions, and Decoration

It's nice to know where you've been, but even better to know how you got there and where you're going. This chapter will explain how the game arrives at your overall score, what it takes to win medals and promotions, and some other tips and hints. With this information, you'll have at least some idea of how far away the next rung on the ladder is. With good information on the scoring system and the various levels of difficulty, you'll know what it takes to reach your goals.

Skill Levels

One of the first things you must choose before a mission is the *skill level* at which you want to play: Rookie, Pilot, Veteran, or Ace. This is a very important decision that will affect a number of game parameters. So that you'll have some idea of what you're getting into, the following are some of the major game areas affected by the skill level selection.

Enemy aircraft tactics. As the skill level goes up, the number of evasive maneuvers available to enemy pilots increases. At the easiest levels, enemy pilots will do little more than turn to try and get away from you, and they may turn and head for home. Once you reach the higher levels, the bad guys have a much larger bag of tricks. Here, they're much more likely to make vertical turns and quick dives as they try to shake you. Once engaged, it's either you or them—they won't turn and run.

Damage levels. The higher up you go, the easier it is to get shot down. At Rookie level it seems you can take an unlimited number of hits, but at Ace level you'll notice a sharp drop in engine power with each hit.

SAM locations. As you move up in skill level, the number of SAM locations increases. Not only will there be more of them, there will be more of the deadly Doppler-guided SA-10 and SA-12 sites as well. And if that's not enough, these sites will also have faster reaction times and faster reload times at higher levels. This means they'll react to your presence and shoot at you sooner, and they'll be able to fire more missiles in a given period of time. At lower levels, you may notice that if you can avoid the first SAM fired from a site, you may be able to get close enough to destroy it before it can shoot again. At high levels, you won't have that luxury; the enemy may be able to get off three, four, or even five missiles as you approach.

Gunsight kill area. At rookie level it seems that as long as an enemy plane is somewhere in front of you, a quick burst from the gun will kill it. As you progress, this "kill area" becomes much smaller, requiring you to shoot much better and to time your shots just right.

Number of enemy aircraft. Not only are SAM sites more numerous at high skill levels, bad guys in the air are also more plentiful. That, however, can be a blessing in disguise—more planes means more targets, and that means a higher score!

Scoring System

The system MicroProse uses in most of its games for tallying your score includes a base level score for each target hit. That score is then modified based on a number of considerations. Such is the case with *F-15 Strike Eagle II*.

Base Scores

Enemy aircraft: 50

Enemy ground targets (not primary or secondary): 25

Primary mission target: 200

Secondary mission target: 100

Friendly aircraft: -100

Friendly ground installations: -50

These scores are then multiplied by a number based on the skill level or the region selected.

Aircraft Scores

The number of points awarded for enemy aircraft shot down is based on the skill level you choose. The number of points awarded doesn't change with the various regions. These totals are:

Rookie: 50 points

Pilot: 100 points

Veteran: 150 points

Ace: 200 points

An enemy aircraft shot down at Ace level over Libya will give the same points as one shot down over the Middle East. The point penalty for shooting down a friendly plane is usually double that of the score awarded for destroying an enemy plane, so it's very important to use caution when operating close to friendly airfields.

Ground Target Scores

Points awarded for ground targets vary with the region in which you've selected to fly, *and* they change according to skill level. Since all primary and secondary targets are ground targets, this rule applies to them as well.

Regions offer more points as you move through them in the order they're presented. Libya is the easiest, followed by the Persian Gulf, then Vietnam, and then the Middle East, which is the most difficult.

The base score, as listed above, is multiplied by a number, depending upon which region you're in and the skill level selected. These are a little more complicated to calculate. They range as follows:

Primary targets: 200-3000

Secondary targets: 100-1500

Other ground targets: 25-375

Different combinations of regions and skill levels will give you different scores in these ranges. Penalties for hitting friendly targets go up as well so, once again, caution is advised.

Mission End

How you end the mission will affect your score as well. Once your overall total has been calculated, it may change if you don't have a proper landing. If you crash, your score is reduced by half. A successful bailout will give you three-fourths your total score.

Your total score may also be reduced if it takes you more than one trip to destroy both the primary and secondary targets. If two trips are required, you'll get two-thirds your total; if three trips are required, you'll get one-half your score, and so on. It's very important to destroy both targets in one trip.

Promotions

One thing most players like about MicroProse games is the way short- and long-term goals are presented in the form of promotions and decorations. Promotions are based on your career point total.

Rank	Points Needed
1st Lt.	1,500
Captain	6,000
Major	12,000
Lt. Colonel	25,000
Full Colonel	50,000
General	100,000

You won't be demoted for poor performance, but the Air Force only has so many multimillion-dollar F-15s. Bail out three times and you'll find yourself permanently flying a desk.

Decorations

Everyone loves to be recognized for outstanding achievement; *F-15 Strike Eagle II* does this by awarding medals for valor. These awards are based entirely on your performance in one mission. Your rank doesn't enter in.

Award	One Mission Score
Air Force Commendation	1,000
Distinguished Flying Cross	2,500
Silver Star	4,000
Air Force Cross	6,400
Congressional Medal of Honor	7,800

Although the Purple Heart is included in the medal illustration in the back of the manual, this award isn't available in *F-15 Strike Eagle II*.

NOTE

A quick tip for the medal hungry. If you want to display an impressive row of decorations quickly without earning them, there's a small bug in the software that will let you rack them up in a hurry.

The trick is to fly very difficult missions in Training mode (hit Alt-T in flight). In this mode, enemy missiles won't damage you, and you can replenish your weapons and fuel as you fly (hit Alt-R). Any points you score won't be added to your career total, but any decorations that would have come with your point total will still be awarded. It's quite possible to get *all* the awards, including the CMOH, with a career point total of zero!

Two-Player System

One of the great things about computer games is that you can play them by yourself—but that's also one of the disadvantages. As mentioned before, the real F-15E Strike Eagle is a two-seater aircraft, and the extra set of eyes really comes in handy when operating in hostile areas. This second set of eyes and hands can help when playing the game as well.

The best way to divide up the work is for one player to control the joystick and be the Pilot while the other takes control of the keyboard as the Weapons Officer (WO). The Pilot is in charge and should worry mainly about flying the plane and keeping his eyes on the main screen. The Weapons Officer should keep his eyes on the instruments and tactical screens and keep the pilot informed about altitude in low-flight situations.

If the pilot is in a hard turning fight, it's the Weapons Officer's job to keep an eye on the airspeed and altitude and to provide the necessary warnings. The Weapons Officer should

not become a spectator. Don't let your pilot fly the both of you into the ground! The Weapons Officer should also be in charge of keeping track of SAMs and releasing chaff and flares at the appropriate times.

Fuel Consumption

There's no doubt about it, the F-15 can suck up some jet fuel. Quite often, the success or failure of your mission will depend on your fuel state, so fuel management is important right from takeoff.

The main thing that affects your fuel consumption rate is the throttle setting. Flying around at full military throttle will eat up your gas in a hurry, and using your afterburner will burn gas even faster. The trick is in knowing when to use full power—you must be patient. Don't be in such a hurry to get to the target area. Go in at 60-percent throttle or so; the fuel you save may save your life later.

Altitude also effects fuel consumption, but since most of your flying will be at low levels (below 10,000 feet), this doesn't really concern you. Climb to high altitudes to conserve fuel and you'll attract SAMs from all over the map.

One good thing about being low on fuel is that your top speed increases. A full fuel tank will knock about 100 knots off your top speed.

CHAPTER 11

Intelligence Briefing

OPFOR

It's very likely that you'll face a wide variety of Opposing Forces (OPFOR) weapons that range from the latest Soviet developments, to modern NATO equipment sold earlier to Iran, to Korean War-era MiG-17s. Some of this equipment is certainly better than others, but all of it can—and will—kill you if you're not prepared and knowledgeable about its capabilities.

This section will give you a quick rundown of the enemy equipment you'll face and some basic information on each system.

Surface-to-Air Missiles (SAMs)

Enemy SAMs (Surface-to-Air Missiles) range from almost harmless to extremely dangerous. Make sure you know which is which.

SA-2

Search radar: *Poor pulse radar*

Firing guidance radar type: *Beam-rider pulse radar*

Max altitude: *55,000 feet*

Maneuverability: *Very Poor*

Threat posed: *Mild*

SA-5

Search radar: *Poor pulse radar*

Firing guidance radar type: *Beam-rider pulse radar*

Max altitude: *95,000 feet*

Maneuverability: *Poor*

Threat posed: *Mild*

SA-6

Search radar: *Poor pulse radar*
Firing guidance radar type: *Semiactive pulse radar*
Max altitude: *60,000 feet*
Maneuverability: *Fair*
Threat posed: *Medium*

SA-10

Search radar: *Superb Doppler*
Firing guidance radar type: *Semiactive plus command guidance Doppler*
Max altitude: *70,000 feet*
Maneuverability: *Fair*
Threat posed: *Extreme*

SA-12

Search radar: *Good Doppler*
Firing guidance radar type: *Semiactive plus command guidance Doppler*
Max altitude: *70,000 feet*
Maneuverability: *Fair*
Threat posed: *Extreme*

Hawk

Search radar: *Good Doppler*
Firing guidance radar type: *Semiactive pulse radar*
Max altitude: *52,000 feet*
Maneuverability: *Good*
Threat posed: *Medium*

Tigercat

Search radar: *Poor pulse radar*
Firing guidance radar type: *Visual*
Max altitude: *12,000 feet*
Maneuverability: *Good*
Threat posed: *Mild*

Seacat

Search radar: *Poor pulse radar*
Firing guidance radar type: *Visual*
Max altitude: *12,000 feet*
Maneuverability: *Good*
Threat posed: *Mild*

SA-N-4

Search radar: *Pulse radar*

Firing guidance radar type: *Semiactive pulse radar*

Max altitude: *25,000 feet*

Maneuverability: *Good*

Threat posed: *Medium*

Rapier

Search radar: *Good pulse radar*

Firing guidance radar type: *Semiactive pulse radar*

Max altitude: *24,000 feet*

Maneuverability: *Very good*

Threat posed: *High*

Alr-to-Alr Missiles (AAMs)

AA-2

Homing type: *Infrared*

Range: *14km*

Maneuverability: *Very good*

Threat level: *Mild*

AA-6

Homing type: *Semiactive pulse radar*

Range: *50km*

Maneuverability: *Poor*

Threat level: *Medium*

AA-6 (IR)

Homing type: *Infrared*

Range: *50km*

Maneuverability: *Poor*

Threat level: *Mild*

AA-10

Homing type: *Active Doppler radar*

Range: *64km*

Maneuverability: *Good*

Threat level: *Extreme*

Figure 11-1. Aircraft Carrying AA-10 Alamo Missiles

**AA-10 (IR)**

Homing type: *Improved infrared*

Range: *64km*

Maneuverability: *Good*

Threat level: *Medium*

AIM-7 Sparrow

Homing type: *Semiactive pulse radar*

Range: *44km*

Maneuverability: *Very good*

Threat level: *Medium*

AIM-9 Sidewinder

Homing type: *Infrared*

Range: *12km*

Maneuverability: *Excellent*

Threat level: *Mild*

NOTE

When being tracked by an AA-6 or AA-10, make sure you check the screen to see which type of seeker is being used. Both can be either radar-guided or heat-seeking.

Enemy Aircraft: Soviet-Built

The maneuverability standard used to measure these aircraft is the excellent F-16 Falcon.

MiG-17 Fresco

Designer: *Mikoyan-Gurevich, USSR*

Role: *Fighter*

Max altitude: *52,000 feet*

Air-to-air radar quality: *None*

Maneuverability: *Fair*

MiG-21 Fishbed

Designer: *Mikoyan-Gurevich, USSR*

Role: *Fighter*

Max altitude: *59,000 feet*

Max speed: *1220 knots*

Air-to-air radar quality: *Poor*

Maneuverability: *Good*

Figure 11-2. MiG-21 Fishbed



MiG-23 Flogger

Designer: *Mikoyan-Gurevich, USSR*

Role: *Fighter*

Max altitude: *61,000 feet*

Max speed: *1190 knots*

Air-to-air radar quality: *Very poor*

Maneuverability: *Fair*

Figure 11-3. MIG-23 Flogger



MiG-25 Foxbat

Designer: *Mikoyan-Gurevich, USSR*

Role: *Interceptor*

Max altitude: *80,000 feet*

Max speed: *1860 Knots*

Air-to-air radar quality: *Medium*

Maneuverability: *Poor*

Figure 11-4. MiG-25 Foxbat



MiG-29 Fulcrum

Designer: *Mikoyan-Gurevich, USSR*

Role: *Fighter*

Max altitude: *55,000–65,000 feet*

Max speed: *1260 knots*

Air-to-air radar quality: *Medium*

Maneuverability: *Very good to excellent*

Enemy Aircraft: NATO-Built

F-4 Phantom II

Designer: *McDonnell Douglas, USA*

Role: *Fighter, strike fighter*

Max altitude: *58,750 feet*

Max speed: *1260 knots*

Air-to-air radar quality: *Fair*

Maneuverability: *Fair to good*

F-5 Tiger II

Designer: *Northrop, USA*

Role: *Fighter, strike fighter*

Max altitude: *51,000 feet*

Max speed: *950 knots*

Air-to-air radar quality: *Poor*

Maneuverability: *Fair*

F-14D Tomcat

Designer: *Grumman, USA*

Role: *Fighter, interceptor*

Max altitude: *56,000 feet*

Max speed: *1350 knots*

Air-to-air radar quality: *Excellent*

Maneuverability: *Good*

F-1 Mirage

Designer: *Dassault-Breguet*

Role: *Fighter, strike fighter*

Max altitude: *65,000 feet*

Max speed: *Mach 2.2*

Air-to-air radar quality: *Poor*

Maneuverability: *Fair*

Regional Intelligence Estimates and Info

Libya

Reference: Libya ONC map provided with the software package.

1. **MISSION:** You'll be assigned to make *deep interdiction* attacks on valuable targets well within the Libyan airspace and within its air defense range. The three major areas of operation will be the area surrounding Tripoli, the oil field and equipment to the south of Port Brega, and the area surrounding Benina.

2. **ENEMY SITUATION:** An undeclared state of war exists with the government of Libya. Authorization has been given to attack all targets. Military and oil-producing targets are highest priority.
- A. Characteristics of the Area of Operations
1. Military Geography: Topography
 - a. *Situation:* Both corners of the Area of Operations are marked by mountainous areas (see the map)—the Jabal Nafusah on the Tripoli corner and the Al Jabal al Akhdar on the Al Bayda corner. Otherwise, the area is mostly hard-packed desert and very flat.
 - b. *Effect on Enemy Capabilities:* Due to the flat nature of the land, radar and visual sighting ranges are generally very good, especially in the heavily defended area around the Gulf of Sirte. The exceptions are the two mountainous areas mentioned above.
 - c. *Effect on Friendly Operations:* If missions call for operations beyond these mountainous areas, it's possible to avoid radar detection by sneaking around the corner, behind the mountain, and into Libyan territory.
 2. Military Geography: Hydrography
 - a. *Situation:* Libya's coastline is dominated by the large Gulf of Sirte. The navigation rights and coastal waters claims regarding the gulf have been the source of much of the current conflict. This gulf lies in the center of the coastal area and is heavily defended both from the sea and air.
 - b. *Effect on Enemy Capabilities:* Since the Gulf of Sirte is centrally located, it's easier to defend. SAM sites surround the gulf as do air bases. Intruders into the area can expect to be attacked from several different angles at once.
 - c. *Effect on Friendly Operations:* The strength of the gulf defensive system lies on the corners at Benina and Misratah. The center of the gulf approach is usually guarded by a missile boat with air cover.

Depending upon the radar types used, it's possible to get very close to Libyan territory without radar detection by heading directly south from the carrier and either destroying or avoiding the boat and air patrols in that area.

3. Military Geography: Climate and Weather
Shouldn't be a factor.

B. Enemy Military Situation

1. Composition

a. *Air Forces:*

MiG-21 Libya continues to operate a limited number of these outdated aircraft, but they should pose little threat.

MiG-23 These aircraft form the backbone of the Libyan air force. Your F-15E is superior to this aircraft in all areas.

MiG-25 Although they have a lesser number of these aircraft, you should expect to encounter a good number of them.

MiG-29 By far the most capable aircraft in the Libyan inventory, these should be engaged at long range whenever possible. Depending upon the skill level of your opponents, MiG-29s may be your equal in a close dogfight. They're frequently flown by Soviet "advisors."

Air-to-air weapons: The general weapons loadout for Libyan aircraft is:

AA-2 MiG-23

AA-6 MiG-25

AA-10 MiG-29

Again, the most dangerous is the MiG-29 armed with AA-10s. These Doppler-guided missiles can't be fooled with chaff alone. Escape maneuvering is also required.

b. *Naval Forces:* The only part of the Libyan navy that can affect your mission is the section of Soviet-built Nunchucka II missile boats. These boats carry SA-N-4 SAM missiles, which are easily defeated with chaff. They also have a few other boats, but these have either poorer air defense capability or none at all.

- c. *Air Defenses:* The Libyan Air Defense network has two basic components: the older component of SA-2 and SA-5 Soviet-made missiles, which are easily defeated with chaff, and the new sections of SA-10 and SA-12 SAMs, which are Doppler-guided and must be outmaneuvered. The newer SAMs are much more dangerous. As you move from easier- to harder-level missions, the mix of missile types shifts from being mostly older to mostly newer.

SAM coverage is strongest near the coast. Once inland, the coverage is somewhat weaker. The least covered areas are the Cyrenaican Desert to the east of Port Brega, the Jabal Zaltan Oil Fields, and the rugged area to the south of Tripoli.

The range of these systems will depend upon their locations. In any case, it's imperative that you assume a low altitude right after takeoff. Approaching the coast at 300 feet is recommended.

2. Location

- a. *Air Bases:* Most of the air strips are located in the eastern portion of the country. Al Bayda, Benina, and Port Brega are all fairly close together and can launch aircraft in support of each other. The only major air base on the western coast is at Tripoli. If this base is destroyed, it will take a while for supporting aircraft to arrive from the east or from the Sabha air base to the south.
- b. *Naval Forces:* By definition, these forces are mobile, but they can normally be found patrolling the gulf close to Port Brega and patrolling the likely approaches from Crete and Malta.
- c. *Air Defenses:* These forces are also mobile. While generally located in the same positions, the system used at that position will vary from mission to mission. When you first take off, it's best to check your display for the strongest signals, which will usually indicate the Doppler SAMs. You can then choose to attack or try to maneuver around them.

C. Friendly Operations.**1. Established Airfields**

Halfar on Malta, Suda Bay on Crete, and the Aircraft Carrier USS *America* are all good landing spots and are out of range of enemy SAM systems. The first two also have regular civilian traffic, so be sure to choose your targets carefully when fighting in these areas.

2. Secret Air Strips

Secret forces in the area are currently operating two airfields. The Yafran air strip is to the south of Tripoli, and Al Mukhayli is to the east of Port Brega. Take care to avoid attacking these strips while attacking other ground targets in the area.

D. Conclusions

The enemy in this area is generally poorly equipped. The major threat in the area comes from the Doppler-guided SAM systems: they're much more dangerous than the enemy aircraft. Enemy naval vessels shouldn't be a threat to your mission. It may be a good idea to avoid them, however, during your ingress to avoid detection as long as possible. Even if they can't attack, they can vector enemy aircraft in your direction. Enemy pilot missile-avoidance skills seem to be lacking, and most aircraft can be effectively engaged with head-on missile shots.

Persian Gulf

Reference: The ONC map provided with the software package.

1. MISSION: You'll be assigned to make quick, hard hitting attacks across the Persian Gulf. There will be three areas of operation: the northwestern end of the gulf around Bandar Khomenyi, the important oil terminal area around Kharg Island, and the gulf chokepoint near the Strait of Hormuz and Bandar-e Lengeh.

2. ENEMY SITUATION: The Iranian leadership has been advocating the overthrow of the American government for some time now in its efforts to export their religious revolution. They have declared that a state of war exists between

the two countries. Although this hasn't been made official by an act of Congress, all targets in Iran may be safely attacked. The most important of these are, of course, oil pumping and storage facilities and missile sites that might be used to attack shipping in the gulf.

A. Characteristics of the Area of Operations

1. Military Geography: Topography

- a. *Situation*: The coastal area is generally flat and open; few good hiding places exist close to the gulf. However, a large spine of mountains runs inland, parallel to the coast, which can provide cover once well inland.
- b. *Effect on Enemy Capabilities*: These mountains function to effectively limit the area covered by any one missile system, and they somewhat limit mutual support. SAM sites in the north end of the gulf can't detect low-flying aircraft beyond Bushehr, due to the mountains. Also, the inland SAM sites at Yazd and Esfahan are blocked and can't lock onto low-flying aircraft near the coast.
- c. *Effect on Friendly Operations*: Maintaining a low flight profile will limit the number of SAM sites that will be able to engage you at one time. Once inland, the rugged Zagros Mountains can be used for cover as well.

2. Military Geography: Hydrography

- a. *Situation*: The main body of water in the area is obviously the Persian Gulf, which separates the safe areas to the south and west from the enemy areas to the north. A major waterway extends inland near the Strait of Hormuz in the southern region. This area has a number of important bridges that would make good military targets.
- b. *Effect on Enemy Capabilities*: The gulf provides a buffer for the enemy and provides a good field of view for radar operations. All aircraft attacking the enemy will have to cross the gulf through fairly good radar coverage. However, the gulf is long and narrow, and Iran is faced with having to defend a very long shoreline. Gaps in the radar coverage may exist, especially east of Kharg Island.

- c. *Effect on Friendly Operations:* Crossing the gulf is a given for almost any mission. Keep an eye out for gaps in radar coverage, but always maintain a low-altitude flight profile.

3. Military Geography: Climate and Weather
Shouldn't affect operations.

B. Enemy Military Situation

1. Composition

a. *Air Forces:*

- F-4E** This American-made aircraft will be your main adversary in the region. Your aircraft is more maneuverable and has a better thrust-to-weight ratio. You should be able to outfly this aircraft.
- F-5E** This aircraft is smaller and lighter than yours, but it's also underpowered with a poor avionics system.
- F-14** A strong dogfighter with excellent avionics. Luckily, they're very complex to maintain and few are available at any one time. You'll certainly run up against one or two. Best to engage at long range with AMRAAMs.

Air-to-air weapons: All enemy aircraft can be equipped with early-version AIM-9 Sidewinder missiles. While they're good homers, they're also very short ranged and will frequently run out of fuel before reaching you. They can also be countered by flares. A few F-5s and F-14s may be fitted with early-version AIM-7 Sparrows. These can be countered with chaff and should be few and far between.

Your most dangerous opponent will be the F-14, due to its ability to detect and track you at long range. You won't face Doppler-guided air-to-air missiles in this region.

- b. *Naval Forces:* A number of military naval vessels will be seen in the area, but most of these are harmless. A few will carry Seacat SAMs, but these are relatively short ranged and are easily fooled with chaff alone.

- c. *Air Defenses*: The Iranian air defense system is again made up of outdated NATO components. The Hawk missile is the strongest of the bunch, but is a beam-rider and is easily defeated with chaff. The Rapier is very fast, but also very short ranged, and is also defeated by chaff. A few Tigercat missiles may show up from time to time but are very easy to defeat and mostly ineffective.

You're lucky there are no Doppler-guided SAMs operating in this area. Anything fired at you can be fooled with chaff.

2. Location

- a. *Air Bases*: Several bases line the coast, and another group is scattered in and beyond the mountains. The air bases provide good coverage and can launch a fighter to your position very quickly. You're rarely more than a minute or two away from enemy fighter coverage.
- b. *Naval Forces*: The armed patrol boats will generally stay close to important target areas, which means you should look for good coverage around Kharg Island, Bandar Khomenyi, and the Strait of Hormuz.
- c. *Air Defenses*: SAM coverage is widely spaced with strong coverage near Kharg Island, Bandar Khomenyi, and Bandar 'Abbas. SAMs also guard most airfields. Also, a large gap exists between Bushehr and Bandar 'Abbas, which you can exploit.

C. Friendly Operations

1. Established Airfields

Missions will generally start from either Ras Shaffaniyah in Saudi Arabia or Bahrain. Air strips that are close to enemy territory and available for emergency landings are Kuwait City, almost directly north of Ras Shaffaniyah (it may not show up on the display map in the cockpit) and Dubai, close to the Strait of Hormuz. These sites should be avoided if possible—both will frequently lie within range of enemy SAMs, which will make landing difficult for you.

The USS *Nimitz* is also just beyond the Strait

of Hormuz and can be used if necessary. Enemy aircraft won't normally follow you all the way across the gulf, making the landing sites there a little safer.

2. Secret Airstrips

A secret rebel airstrip exists just to the northwest of Bushehr in the mountains. This strip shouldn't be attacked.

3. Friendly Air Traffic

Several airports in the area have heavy civilian air traffic, especially Kuwait City. Take care when operating or fighting in these areas. Make sure you ID all targets before firing.

D. Conclusions

The enemy in this area will, as a rule, perform poorly. They're equipped with inferior weapons and seem to lack the proper training and discipline. SAM systems aren't very effective, and enemy pilots seem to be very slow on the trigger. They seem to wait a long time before firing AAMs, which may give you several extra seconds for attacking ground targets, if needed. As a rule, the F-14s should be taken out first since they often function as AWACs aircraft, using their long-range radars.

Vietnam

Reference: Vietnam ONC map provided with the software package.

Map Corrections: There are two SAM sites, three squares due east of Pnom Penh, which aren't shown on the map. Named Ban Khea and Ban Phlak, they're roughly located at XLI76. The SAM site and air base referred to on the map as Wattay is called Viangchan on the F-15 cockpit map display.

1. **MISSION:** You'll be assigned to make *deep interdiction* attacks on valuable targets well within the Vietnamese airspace and within its air defense range. The two major areas of operation will be the area surrounding Hanoi in the

north, and the lesser defended areas along the Ho Chi Minh Trail to the south.

2. **ENEMY SITUATION:** An undeclared state of war exists with the government of North Vietnam. Authorization has been given to attack all targets. Military, transportation (bridges), and supply dumps are highest priority.

A. Characteristics of the Area of Operations

1. Military Geography: Topography

- a. *Situation:* The heavily populated area to the north lies in a fairly flat area near the coast. All of the coastal areas are relatively flat and open, but once you cross beyond them, you'll find a large spine of mountains that run the length of the operating area. Beyond the mountains, the land becomes a flat delta plain.
- b. *Effect on Enemy Capabilities:* Due to the flat nature of the land near the coast, radar and visual sighting ranges are generally very good, especially in the heavily defended area around Hanoi.
- c. *Effect on Friendly Operations:* If missions call for operations beyond the mountainous areas, it's possible to break radar lock by flying at very low altitude once your beyond the mountain ranges.

2. Military Geography: Hydrography

- a. *Situation:* Both North and South Vietnam are bordered by the Gulf of Tongking and the South China Sea. A number of rivers empty into the gulf near Hanoi. Bridges spanning these rivers are an important link in the local transportation network.
- b. *Effect on Enemy Capabilities:* Both countries have long coastlines that are difficult to defend.
- c. *Effect on Friendly Operations:* The hydrography in this area favors our operations. The large gulf makes an excellent area for carrier operations, and since the enemy has almost no naval forces, these carriers can operate in relative safety. Missions into the north and south can be launched from the carriers based in the gulf.

3. Military Geography: Climate and Weather
Shouldn't be a factor.

B. Enemy Military Situation**1. Composition****a. Air Forces:**

MiG-17 These 1950s-era aircraft form the backbone of the North Vietnamese Air Forces. Although extremely outdated by our standards, when expertly flown, they can be a threat.

MiG-21 A fair number of these more advanced aircraft have been provided by the Soviets. Although better than the MiG-17, they should pose little threat in a dogfight.

MiG-23 An even fewer number of these aircraft have been provided. More will show up at higher difficulty levels.

Air-to-air weapons: The general weapons loadout for Vietnamese aircraft is:

AA-2 MiG-17, MiG-21

AA-6 MiG-23

Luckily, the enemy isn't armed with Doppler-guided air-to-air missiles, but the newer MiG-23s will be armed with both heat-seeking and radar-guided AA-6 missiles. It's important to verify the type of weapon being used before you employ countermeasures. The AA-2 heat-seekers used by the other aircraft are very short ranged. Wait until the missile is quite close before wasting a flare or making a maneuver—they'll frequently run out of propellant, especially if you're at high speed.

- b. *Naval Forces:* North Vietnam has no real navy to speak of, but it does have a number of small vessels that will stay close to shore. They aren't equipped with SAMs and shouldn't pose a threat.
- c. *Air Defenses:* The area around Hanoi and Haiphong in the north has one of the strongest air defense systems in the world. Extreme caution should be used when operating in this area.

Most of the SAMs encountered will be older SA-5s; a few SA-2 systems are also used. In a high-level difficulty

mission, a few Doppler-guided SA-12 systems will show up also. These are long-ranged and very dangerous.

The main SAM threat in this area comes from sheer numbers. The open coastal land area allows the SAM sites in the north to mutually support each other. Expect to find SAMs coming at you from every direction while in this area. It's best to decoy the SA-5s with chaff while taking out the more deadly SA-12s.

The area to the south has much lighter defenses, but the SAM sites in and around Pnom Penh in Cambodia will be troublesome for all aircraft operating out of the Ton San Nhut air base near Saigon. It's frequently a good idea to attack these sites immediately after takeoff to avoid problems later.

2. Location

- a. *Air Bases:* Most of the air strips are located in the northern portion of the country near Hanoi. Quite a few airfields are packed in fairly close together and can launch aircraft in support of each other. The major base in the south is across the border in Cambodia at Pnom Penh.
- b. *Naval Forces:* These forces are few and far between and should pose no threat.
- c. *Air Defenses:* These forces are also mobile. While generally located in the same positions, the system used at a position will vary from mission to mission. When you first take off, it's best to check your display for the strongest signals, which will usually indicate the Doppler SAMs. You can then choose to attack or try to go around them.

C. Friendly Operations

1. Established Airfields

You'll have no shortage of airfields to use in this region. Besides the two aircraft carriers in the gulf, there are safe strips on to the west in Thailand and all along the South Vietnamese coast.

Since there are so many bases in the area, you can adjust your attack plan to take off at one base and land at another. In the north, this might mean taking off from a carrier and attacking the target and then

continuing on into Thailand to land. In the south, you would take off from Tan San Nhut and attack your targets and then land at Nha Trang or Da Nang. This keeps you from having to cross back over into "hot" areas.

One friendly area to take note of is Udorn air base in Thailand. This base is located very close to the North Vietnamese border and could be mistaken for an enemy base in the heat of battle.

D. Conclusions

The enemy in this area is very poorly equipped but highly motivated. The major threat in the area comes from the Doppler-guided SA-12 SAM system and from the high quantity of SA-5 missiles. They're much more dangerous than the enemy aircraft. Enemy naval vessels shouldn't be a threat to your mission. Enemy pilot missile avoidance skills seem to be lacking, and most aircraft can be effectively engaged with head-on missile shots.

Middle East

Reference: Middle East ONC map provided with the software package.

Map Corrections: The air base and SAM site named Palmyre on the map is referred to as Tadmur on your cockpit map display.

1. **MISSION:** You'll be assigned to make *deep interdiction* attacks on valuable targets well within Lebanese, Syrian, Jordanian, and Iraqi airspace. The two major areas of operation will be the area surrounding Beirut and Damascus along the coast, and the northern areas of Mosul and Baghdad, where two nuclear reactors are located.
2. **ENEMY SITUATION:** An undeclared state of war exists with the governments in this area. Authorization has been given to attack all targets, but military and nuclear reactor targets are highest priority.
 - A. Characteristics of the Area of Operations
 1. Military Geography: Topography
 - a. *Situation:* The entire coastal area is marked by high

mountains. Otherwise, the area is mostly hard packed desert and very flat.

- b. *Effect on Enemy Capabilities:* Due to the mountainous nature of the land near the coast, radar and visual sighting ranges aren't optimum. Mutual support isn't always possible due to the mountains blocking radar coverage.
- c. *Effect on Friendly Operations:* The mountains near the coast will help block enemy radar signals during your approach. Maintaining a low flight profile in this area will prevent other SAM sights located farther away from locking onto your position. Once beyond the mountains, the area is very open and flat, making it possible for the enemy to detect you at long range.

2. Military Geography: Hydrography

- a. *Situation:* The area's coastline with the Mediterranean is rather short, but much of the population is located near the coast.
- b. *Effect on Enemy Capabilities:* The small coastal area of Lebanon and Syria is easily and heavily defended. Good radar coverage out to sea makes an unobserved approach very difficult.
- c. *Effect on Friendly Operations:* Our navy has complete control of the Mediterranean. The USS *Eisenhower* aircraft carrier is located just off shore and is a well-located launching point for flights against targets near the coast.

3. Climate and Weather
Shouldn't be a factor.

B. Enemy Military Situation

1. Composition:

a. *Air Forces:*

MiG-21 They continue to operate a limited number of these outdated aircraft, which should pose little threat.

MiG-23 These aircraft form the backbone of the enemy air force. Your F-15E is superior to this aircraft in all areas.

- MiG-29** By far, these are the most capable aircraft in the enemy inventory. They should be engaged at long range whenever possible. Depending upon the skill level of your opponents, MiG-29s may be your equal in a close dogfight. They're frequently flown by Soviet "advisors."
- F-1** The Mirage aircraft is of good, but old, design. Early ties to the French government in this area ensures that you'll see numerous aircraft of this type.
- F-5** This is a small but very maneuverable aircraft, normally lightly armed.

Air-to-air weapons: The general weapons loadout for Middle East aircraft is:

- AA-2 MiG-23, F-5
 AA-6 F-1
 AA-10 MiG-29

Again, the most dangerous is the MiG-29 armed with AA-10s. These Doppler-guided missiles can't be fooled with chaff alone. Escape maneuvering is also required.

- b. *Naval Forces:* Enemy naval forces in this area are inconsequential.
- c. *Air Defenses:* The enemy Air Defense network has two basic components: the older component of SA-2 and SA-5 Soviet-made missiles, which are easily defeated with chaff, and the new sections of SA-12 SAMs, which are Doppler-guided and must be outmaneuvered. These newer SAMs are much more dangerous. As you move from easier to harder missions, the mix of missile types will shift from being mostly older to mostly newer.

SAM coverage is strongest near the coast. Once inland, the coverage is somewhat weaker. The least covered areas are in the Syrian Desert.

The SA-12 systems are few in number, but there will almost always be one located near the nuclear reactor sites in the northern region. The range of systems

will be dependent upon their locations. In any case, it's imperative that you assume a low altitude right after takeoff. Approaching the coast at 300 feet is recommended.

2. Location

- a. *Air Bases*: Most of the air strips are located in Syria. There are also bases near the Iraqi reactor sites.
- b. *Air Defenses*: These forces are also mobile. While generally located in the same positions, the system used at that position will vary from mission to mission. When you first take off, it's best to check your display for the strongest signals, which usually indicate the Doppler SAMs. You can then choose to attack them or try to go around.

A new development in this area is the use of double SAM sites. The ONC map shows where the SAMs are located, but it doesn't show that the following locations operate *two* SAM systems at that location:

Baghdad
Damascus
Mosul
Kirkuk
Amman
Halab

Keep in mind that you'll need to use *two* AGMs to quiet the SAM activity at these sites.

C. Friendly Operations

1. Established Airfields

The Malatya air base in Turkey will be the launch and recovery site for most missions in the north. When returning to the base, it's best to make your approach from the north, which will keep you out of range of the SAM sites in Syria.

The USS *Eisenhower* or a strip in Israel will usually be the launch point for missions in the south. Due to the heavy SAM coverage in the area, it's best to recover at Akrotiri air base on Cyprus. This will get you out of SAM range and allow for an unmolested landing.

2. Secret Air Strips

Rebel forces in enemy territory operate two secret air-strips just outside of Beirut. Take care when attacking targets in this area to avoid these two locations.

D. Conclusions

The enemy in this area is generally well equipped. The major threat in the area comes from the Doppler-guided SAM systems, which are much more dangerous than the enemy aircraft. Enemy naval vessels shouldn't be a threat to your mission. For the best results at the Ace difficulty level, you should try to get missions with both the primary and secondary targets close together.

Good mission assignments might included attacking the bridge and reactor at Mosul, or a target in Damascus and Beirut. In both cases, the targets are close together, which means you only have to fight your way into one target area.

Safety is always located out to sea when operating in the south, and back to the west when flying in the north.

APPENDICES

APPENDIX A

Suggested Reading List

If you want to learn more about air combat or the F-15, I suggest you take a look at the following books.

Books on Air Combat

- Franks, Norman. 1986. *Aircraft Versus Aircraft*, New York: Macmillan.
- Gunston, Bill, and Lindsay Peacock. 1989. *Fighter Missions*. New York, New York: Orion Books.
- Gunston, Bill, and Mike Spick. 1983. *Modern Air Combat*. New York: Crescent Books.
- Nordeen, Lon O., Jr. 1985. *Air Warfare in the Missile Age*. Washington, D.C.: Smithsonian Institution Press.
- Shaw, Robert L. 1985. *Fighter Combat: Tactics and Maneuvering*. Annapolis, MD: Naval Institute Press.
- Sims, Edward H. 1972. *Fighter Tactics and Strategy 1914-1970*. Fallbrook, CA: Aero Publishers.
- Spick, Mike. 1983. *Fighter Pilot Tactics: The Techniques of Day-light Air Combat*. New York: Stein and Day Publishers.
- Spick, Mike. 1988. *The Ace Factor*. Annapolis, Maryland: Naval Institute Press.

Books on the F-15

- Ethel, Jeff. 1981. *F-15 Eagle*. London, England: Ian Allan Ltd.
- Gething, Michael. 1983. Vol. 1. *Modern Fighting Aircraft: F-15*. New York: Arco Publishing.

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APPENDIX B

Abbreviations and Acronyms

AAA	Antiaircraft Artillery
AAM	Air-to-Air Missile
ACM	Air Combat Maneuvering
AGM	Air-to-Ground Missile
Alt	The Alt key on your keyboard
AMRAAM	Advanced Medium-Range Air-to-Air Missile
ASAT	Antisatellite
ATF	Advanced Tactical Fighter
AWACS	Airborne Warning and Control System
BFM	Basic Flight Maneuvers
CAP	Combat Air Patrol
CAS	Close Air Support
CBU	Cluster Bomb Unit
CRT	Cathode Ray Tube
DMZ	Demilitarized Zone
DRF	Dual-Role Fighter
ECM	Electronic Countermeasures
ERDT	Eagle Rapid Deployment Team
FEBA	Forward Edge of the Battle Area
FLIR	Forward-Looking Infrared
FX	Fighter Experimental
G	Gravity measurement; 2 Gs equals two times the force of gravity, or double the weight
GIB	Guy in Back
HUD	Head-Up Display
IIR	Imaging Infrared
ILS	Instrument Landing System
IR	Infrared, the heat portion of the radiation spectrum
ITP	Initial Test Program

km	Kilometer
LANTIRN	Low Altitude Navigation and Targeting Infrared for Night
LGB	Laser-Guided Bomb
Lt. (j.g.)	Lieutenant, Junior Grade
Mach	The speed of sound; Mach 2 equals two times the speed of sound
Max	Maximum
MiG	Mikoyan/Gurevich; Soviet aircraft manufacturer
mm	Millimeter
MSIP	Multistage Improvement Program
NATO	North Atlantic Treaty Organization
NAV	Navigation; usually refers to the NAV cursor at the top of the screen
OPFOR	Opposing Forces
PLO	Palestine Liberation Organization
ROE	Rules of Engagement
RPV	Remotely Piloted Vehicle
SA	Situational Awareness
SAM	Surface-to-Air Missile
SARH	Semiactive Radar Homing
Su	Sukhoi; Soviet aircraft manufacturer
TFW	Tactical Fighter Wing
VMax	The maximum airspeed an aircraft can attain before sustaining structural damage
WSO	Weapons Systems Officer; an Air Force backseater

APPENDIX C

Definition of Terms

ballistic

Usually refers to climbing straight up so that altitude is gained due to engine power, not wing lift.

bandit

An enemy aircraft.

belly-check

Usually a 360-degree roll to check for enemy aircraft while in the blind spot beneath the aircraft.

black boxes

Electronic components for various aircraft systems mounted in removable boxes to facilitate rapid change and maintenance.

bogey

An enemy aircraft.

bounce

To attack an enemy aircraft, usually from above.

canard

Small wings, usually mounted toward the nose of an aircraft to improve maneuverability.

chaff

Thin, light strips of foil used to create a large return on an enemy radar. Used to decoy radar-guided missiles.

closing

Reducing the distance between your aircraft and another.

cold-side

The underside or belly of an aircraft.

dogfighter

Aircraft designed primarily for air-to-air combat.

Doppler

A radar system that makes use of the shift in frequency of signals reflected from earth, ahead or behind an aircraft, to obtain its true airspeed and location.

envelope

The performance limits of an aircraft.

flare

Very hot decoys used to fool heat-seeking missiles.

gomer

An enemy.

guns kill

To destroy an enemy aircraft at close range with an onboard cannon—the most difficult type of kill.

hot-side

The top of an aircraft.

HOTAS

Hands on throttle and stick.

infrared

The portion of the energy spectrum felt as heat but not seen.

inverted

Flying an aircraft upside-down, or with the canopy toward the ground.

jamming

Emitting signals so strong that they overwhelm an enemy's detection system and render it useless.

jink

To make wild and rapid movements with the aircraft, both up and down and side to side, usually in an attempt to avoid an incoming missile or to evade an enemy aircraft.

click

One kilometer or 1000 meters.

multibogey

More than one enemy aircraft in the combat area.

pipper

The circle or dot used for aiming the cannon or for lining up a bomb drop.

pod

Streamlined containers used to carry equipment under an aircraft's wing or belly.

punch out

To activate the ejection seat during flight.

retarded

A bomb that employs fins to increase its drag so it can be dropped from low altitude without catching the aircraft in the bomb blast.

signature

Characteristic "fingerprint" every type of radar equipment emits.

six

The 6 o'clock position behind an aircraft. Directly in front is 12 o'clock; directly behind is 6 o'clock.

slick

Bombs without retarding fins.

smart

A bomb with an onboard system that can identify a target and adjust its flight path to ensure a hit.

stall

A condition in which there isn't enough air moving over an aircraft's wing to produce adequate lift to keep the aircraft under control.

wild weasel

An aircraft assigned the mission of leading an attack and identifying and destroying SAM sites.

1. The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present and for the development of a sense of national identity. The author points out that the study of history is not merely a collection of facts, but a process of interpretation and analysis. It is through this process that we can understand the causes and consequences of the events that have shaped our nation.

2. The second part of the paper examines the role of the federal government in the development of the United States. It is argued that the federal government has played a central role in the creation of the nation, and that its actions have shaped the course of American history. The author discusses the various powers of the federal government, and the ways in which these powers have been exercised over time. It is also noted that the federal government has been the subject of much controversy, and that its role has been the subject of much debate.

3. The third part of the paper discusses the role of the states in the development of the United States. It is argued that the states have played a central role in the creation of the nation, and that their actions have shaped the course of American history. The author discusses the various powers of the states, and the ways in which these powers have been exercised over time. It is also noted that the states have been the subject of much controversy, and that their role has been the subject of much debate.

4. The fourth part of the paper discusses the role of the people in the development of the United States. It is argued that the people have played a central role in the creation of the nation, and that their actions have shaped the course of American history. The author discusses the various ways in which the people have participated in the government, and the ways in which their actions have shaped the course of American history. It is also noted that the people have been the subject of much controversy, and that their role has been the subject of much debate.

5. The fifth part of the paper discusses the role of the future in the development of the United States. It is argued that the future is a time of great opportunity, and that the actions of the present will shape the course of American history. The author discusses the various ways in which the future can be shaped, and the ways in which the actions of the present can shape the course of American history. It is also noted that the future is a time of great uncertainty, and that the actions of the present will shape the course of American history.

Index

- acceleration performance 33-35
- ace mode gun fighting 134
- afterburners 138
- aileron roll 60-61
- air combat 40-53
 - Boelcke rules 53
 - stages 41-52
 - tactics 40-41
- air combat mode 131-32
- aircraft damage 135
- Air Force
 - functions 5-6
 - history 3-5
- air superiority missions 131-32
- all-aspect capability 23
- altitude 31-33, 36
- Alt-Q 59
- Alt-R 59
- Alt-T 78
- AMRAAM missile 24-25, 156-58
- anticipation firing 164
- ATF (Advanced Tactical Fighter) 27
- attacking 42-43
- authorization codes 133
- ball-out 132
- ballistic dive 35
- barrel roll 62-63
- barrel roll attack 86-87
- Boelcke, Oswald 52-53, 79, 125
- bombing 116-17
 - dive 118-19
 - high-altitude dive 122
 - on afterburners 132
 - pop-up 120-21
- break turn 66-67
- cannon 111, 155, 164
- chaff 160-61
- checkrides
 - #1 78
 - #2 92
 - #3 102
 - #4 108
- clearing the map 133
- climb performance 33
- closing 42
- Combat Air Patrol (CAP) 40
- damaged aircraft 135
- defensive spiral dive 98-99
- descending half-loop. *See* Split-S
- disengagement 94-95
- diving
 - for separation from a missile shot 90-91
 - with afterburners on 90
- olittle, Jimmy 5
- dual-role fighter 15
- Eagle Rapid Deployment Team 6-7
- ejection 136
- accidental 131
- enemy
 - weapons 175-82
 - maneuverability 31
- enemy locations flying 124
- energy state 31-33
 - kinetic 31
 - potential 31
- Enola Gay* 5
- F-1 Mirage 182
- F-4 Phantom 7, 181
- F-5 Tiger 182
- F-14 Tomcat 137, 182
- F-15E Strike Eagle 6
 - combat action 11-13
 - development 7-11
 - fact sheet 15-18
 - future 27-28
 - safety record 10
 - targeting/navigation system 18-19
 - versus F-4 10
 - versus MiG-21 12
 - versus MiG-25 12
 - weapons 9, 20-28
- F-15 Streak Eagle 10-11
- F-86 Sabre 7
- FEBA (Forward Edge of the Battle Area) 38
- flares 136
- FLIR (Forward-Looking InfraRed) system 19
- flying low 134
- Ford, Gerald 11
- fuel consumption 174
- G force 36-37
- gliding 134, 136
- ground locating 134
- heading indicator 152
- head-on attacks
 - gun attack 104-5, 112-13
 - turning attack 106-7
- high-G barrel roll 92-93
- HUD (Head-Up Display) 19

- Immelmann maneuver. *See* vertical half-loop
- Immelmann, Max 52
- increased performance engine 27
- inverted flight 74-75, 116
 - dive 38-39
 - performance 38-39
- joystick use with keyboard 134
- landings
 - carrier 154-55
 - runway 151-54
 - simulated 136
- LANTIRN (Low-Altitude Navigation/Targeting InfraRed for Night) system 18-19
- lateral separation 50-51
- lead turn 43-44
- load factor 36
- loop 64-65
- low flying 134
- maneuvers 43-47, 60-77
 - defensive 92-101, 122-24
 - head-on 102-8
 - offensive 79-91
- Maverick missile 20-21, 157
- max effective range 156
- max range 156
- McDonnell, James 8
- Meier, Sid 131
- MiG-17 179
- MiG-21 11-12, 179
- MiG-23 180
- MiG-25 7, 12, 180
- MiG-29 181
- missiles
 - AA-10 161, 177
 - beam-rider 159
 - determining types 159
 - Doppler 159-60
 - enemy air-to-air 177-78
- missions
 - ending 172
 - Haiphong 141
 - Hanoi 143-44, 190-94
 - Iraq 144-45
 - Libya 139-40, 182-86
 - Persian Gulf 145-48, 186-90
 - planning 133, 167-68
 - Syria 141-42, 194-98
 - Yom Kippur War 140
- multiple bogey situations 124-29, 158
 - cautiously aggressive 126-27
 - totally aggressive 128-29
 - totally defensive 124-25
- Multistage Improvement Program (MSIP) 149
- NAV cursor 152
- nose-to-nose turn 44-46
- nose-to-tail turn 46-47
- out-of-plane 103
- P-51 Mustang 7
- Pershing, John Joseph 4
- Phoenix missile 8
- pitch back 102-3
- Project FX 7-8
- pursuit curves 48-50
 - lag 48-50
 - lead 48-50
 - pure 48
- roll acceleration 37
- roll performance 37
- SAMs 158-60, 170
 - enemy 175-77
 - offset approach 161-63, 166-67
- scoring
 - ending missions 172
 - decorations 172-73
 - points 132, 170-71
 - promotions 172
- Sidewinder missile 22-23, 26, 42, 156-58
- simulations
 - F-15 Strike Eagle I 57-58
 - F-15 Strike Eagle II 58-59
- situational awareness 52
- skill levels 136-37, 169-70
 - enemy aircraft tactics 169
 - kill area 170
- Sparrow missile 23-26
- speed 31-33, 36-37
 - effects on fuel consumption 174
- speedbrake 76
 - extension 76-77
 - reversal 96-97
- spin recovery 137
- Split-S 68-69
- stall turn 72-73
- Stealey, Bill 131
- strafing ground targets 155-56
- takeoffs 151
- throttle 37
- thrust (increasing) 37
- Training mode 173
- turn performance 36-37
 - instantaneous 36
 - maximum 36
 - sustained 36
- turn radius 36-37
- turn rate 36-37
- two-player simulation 137-38, 173-74
- unloading 35, 37
- USS *Hornet* 5
- vertical half-loop 70-71

- vertical spiral 100-101
- Villa, Pancho 4
- Vmax 35
- weapons 9, 20-28, 42, 155-58
 - accuracy 164-65
 - damaged 135
 - firing short-range missile at target behind you 114-15
 - list 20
- yo-yo
 - high 82-83
 - low 80-81
 - series 108
 - straight 84-85
- zero G condition 35
- zoom maneuver 32
 - from a turn 88-89



The Official F-15 *Strike Eagle* Handbook

Richard G. Sheffield

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Other books by Richard Sheffield:

40 Great Submarine Simulator War Adventures
Gunship Academy: Tactics and Maneuvers for Attack Helicopter Simulations
Jet Fighter School: Air Combat Simulator Tactics and Maneuvers
Jet Fighter School II: More Training for Computer Fighter Pilots
The Official F-19 Stealth Fighter Handbook
Sub Commander: Tactics and Strategy for WWII Submarine Simulations

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Contents

Foreword	v
Preface	vii
Introduction	ix
Part I. Ground School	1
1. Historical Overview	3
2. The F-15 Version E, Designation: <i>Strike Eagle</i>	15
3. Air Combat Orientation	31
Part II. ACM (Air Combat Maneuvering)	55
4. Basic Flight Maneuvers	57
5. Advanced Maneuvers	79
Part III. Software Orientation for the Original Version of	
<i>F-15 Strike Eagle</i>	109
6. Winning Tactics for the Original <i>F-15 Strike Eagle</i> ...	111
7. General Hints, Tips, and Game Information	131
8. Mission Maps and Briefings	139
Part IV: Software Orientation for <i>F-15 Strike Eagle II</i>	149
9. Winning Tactics for <i>F-15 Strike Eagle II</i>	151
10. Scoring, Promotions, and Decoration	169
11. Intelligence Briefing	175
Appendices	
A. Suggested Reading List	201
B. Abbreviations and Acronyms	203
C. Definition of Terms	205
Index	209

Foreword

by Sid Meier

Way, way back in computer history—when Donkey Kongs and Froggers roamed the earth—MicroProse decided to see if humans were ready for a higher game form. It was 1985 when we put the original *F-15 Strike Eagle* “out there.”

It was the first game to require fast and frequent decision-making, based on highly-complex, high-intensity situations. While other games required immediate and reflexive reaction on the joystick, *F-15 Strike Eagle* introduced a new—and definitely more exciting—requirement: immediate and *reflective* action. You had to *think* about what you were doing, and think fast. You couldn’t just blast anything in sight.

First of all, there might be too many things to shoot. Also, the current weapons might not have sufficient range or might not be the right weapon for a particular target. Maybe you didn’t have time to switch to the right weapon. And maybe instead of shooting somebody, your primary concern right then was to keep from being shot. And maybe if you did a scissors turn, that would shake the guy off your tail, knock out the other guy, and get you lined up for a bombing run all at once. Decisions. Decisions. Decisions. Just like in real life.

Since that early dawn of sophisticated computer gaming, MicroProse has learned a lot about computer combat simulation. If you have *F-19 Stealth Fighter*, our winner of the Simulation of the Year Award for 1988, you’ve seen much of it: spectacular polygon-based 3-D graphics; thousands of landmarks and terrain features based on the actual geography of the region being simulated; an almost infinite array of missions, each with a primary and secondary objective; and more sophisticated artificial intelligence to make enemies respond authentically in any situation arising on any of the missions.

But, *F-19* and *F-15* are two entirely different games. *F-19* requires you to move toward your target quietly, carefully avoiding enemy confrontation for as long as possible. In *F-15*, on the other hand, direct enemy contact is unavoidable. The accent, therefore, is on fast action and plenty of dogfights.

We knew that incorporating the technological enhancements of *F-19* into *F-15* would result in two distinct games, each with its own powerful appeal. There is probably no greater testament to the strength of *F-15 Strike Eagle II* than that a computer entertainment writer of Rich Sheffield's caliber would devote the time and energy to write a full length book about it.

Thanks for your interest in MicroProse. Keep your eye on us; we have a host of terrific new games heading your way.

Have a great time with *F-15 Strike Eagle II*.

Preface

This book is a combination of factual and fictional information. Where applicable and appropriate, accurate military data from reliable nonclassified sources has been used.

The layout of the book is meant to resemble a military manual. While the style, structure, and format have come from a number of U.S. Government publications, the book isn't intended to represent any one manual in particular.

The publication of this book is in no way meant to criticize the content or effectiveness of the operator's manuals provided with the simulation by MicroProse. These manuals are extremely well written, and MicroProse continues to set the industry standard for simulation documentation. Rather, this book is a source of further information for those up-and-coming pilots who wish to go beyond the basic operation of the game and get further into the exciting world of air combat.

Introduction

Mission Statement

777th Tactical Fighter Wing
Eagle Rapid Deployment Team

To deploy rapidly, worldwide, in response to threats to national security interests. To successfully fly air interdiction missions, day or night, in all weather, alone or with other aircraft, against tactical and point targets, deep in enemy-controlled territory without the need for dedicated fighter escort.

Purpose and Scope. This handbook provides guidance for commissioned and flight-rated officers assigned to the Eagle Rapid Deployment Team (ERDT). A certain level of flight proficiency and professionalism is expected for those receiving this assignment, so some items may be covered in more detail than others. Historical background is discussed, as is the development of your aircraft, the F-15E Strike Eagle. Policy, practices, directives, and procedures common to the efficient operation of this aircraft in the accomplishment of your assigned mission are covered in some detail.

Explanation of Terms. Abbreviations and acronyms are used extensively throughout this handbook. They'll be defined or explained upon first use. See the end of this publication for a complete list of all abbreviations and acronyms.

Throughout this publication, *aerospace* and *air* are used interchangeably. The use of the term *air* should not be construed as the more limited definition of the aerospace medium.

Notes, Warnings, and Cautions. Items requiring extra attention are prefaced with one of the following statements throughout this handbook:

NOTE

Information that's important and essential to the completion of the mission.

CAUTION

Failure to heed this statement may result in minor personal injury or damage to equipment.

WARNING

Failure to heed this statement could result in severe personal injury, including mission failure or death.

Military Doctrine. *Doctrine* is defined as:

Fundamental principals by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application.

Aerospace doctrine is a statement of officially sanctioned beliefs and war-fighting principals that describe and guide the proper use of aerospace forces in military action. The Air Force promulgates and teaches this doctrine as a common frame of reference on the best way to prepare and employ aerospace forces.

Aerospace doctrine is an accumulation of knowledge that's gained primarily from the study and analysis of experience. As such, doctrine reflects what has usually worked best. These experiences may include actual combat operations as well as tests, exercises, or maneuvers. In those less frequent instances in which experience is lacking or is difficult to acquire (theater nuclear operations), doctrine may be developed through analysis of postulated actions.

Aerospace doctrine has grown from the need to establish common guidelines for military action. These guidelines are particularly important under the stress of combat. For ex-

ample, if a subordinate is unable to communicate with his commander and follows the established doctrine, his actions will normally follow his commander's recommended course of action and support the larger scheme of operations. This example describes the prescriptive nature of doctrine, but it should be emphasized that doctrine provides a recommended course of action. It isn't mandatory. As stated, it requires "judgment in application."

The Air Force has articulated aerospace doctrine at three different levels and depths of detail in the forms of *Basic*, *Operational*, and *Tactical* doctrine.

- **Basic Doctrine** states the most fundamental and enduring beliefs that describe and guide the proper use of aerospace forces in military action. It is the foundation of all aerospace doctrine.
- **Operational Doctrine** applies the principles of basic doctrine to military actions by describing the proper use of aerospace forces in the context of distinct objectives. It anticipates changes that affect the aerospace doctrine, such as technological advances.
- **Tactical Doctrine** applies basic and operational doctrine to military actions by describing the proper use of specific weapons systems to accomplish detailed objectives. Tactical doctrine considers the tactical objective (mine a harbor from the air) and tactical conditions (threats, weather, terrain), and describes how a specific weapons system is employed to accomplish the objective (B-1s lay the aerial mines from low altitude).

An example of this doctrine would be:

Basic Doctrine. An important goal in air warfare is to gain freedom of action in the air environment.

Operational Doctrine. An air commander employs forces to obtain air superiority by orchestrating offensive and defensive counter-air operations, suppressing enemy air defenses, and coordinating support actions.

Tactical Doctrine. F-15s fly sorties such as *combat air patrol* (CAP) in certain numbers and in certain formations. Tactical doctrine describes how CAP missions may be integrated with other weapons systems.

In your situation as a flying officer, you shouldn't have to concern yourself with Basic and Operational doctrine, as they'll be established and passed down from higher authority. Tactical doctrine, however is an immediate concern and will be the focus of this handbook.

Day or night, through perilous weather, deep in enemy-controlled territory—when national security is threatened, you, the *F-15 Strike Eagle* pilot, are there on the front line of action.

From takeoff to landing, *The Official F-15 Strike Eagle Handbook* trains you to plan and complete your mission with the skill and flair of a real ace. A roundtable of F-15 experts, including Bill Stealey, President of MicroProse Software, and Sid Meier, author of *F-15 Strike Eagle*, share tips and information for completing your mission with the most points and a minimum of bailouts.

Here you'll find:

- Specialized tactics, tips, and complete mission briefings
- Illustrations of advanced flight maneuvers and real-life battle tactics
- A complete run-down of the jet fighter's arsenal, plus how to choose the most effective weapons for your mission
- Mission-saving information flagged with *caution* and *warning* boxes
- Points, decorations, and the promotion system demystified
- Military abbreviations, acronyms, and flight jargon completely explained

Richard Sheffield, a flight combat simulator veteran and author of numerous simulator books, has written the perfect companion to the *F-15 Strike Eagle II* manual. So charge up your afterburners, clear the map, and go for the glory. Whether you're perfecting the basics of flying or learning the advanced maneuvers needed to fly victorious in the sky-blue theatre of superjets and smart missiles, *The Official F-15 Strike Eagle Handbook* carries you from takeoff to mission's end.

Happy hunting!

For the *F-15 Strike Eagle* and
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